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THE OIL WEEKLY

WORLD OIL

SPECIALIZED FOR EXPLORATION, DRILLING, PRODUCING,
PIPE LINE OPERATIONS AND MANAGEMENT

MAY, 1953

Exposition Issue

•

Preview of New Products On Display at Tulsa Show

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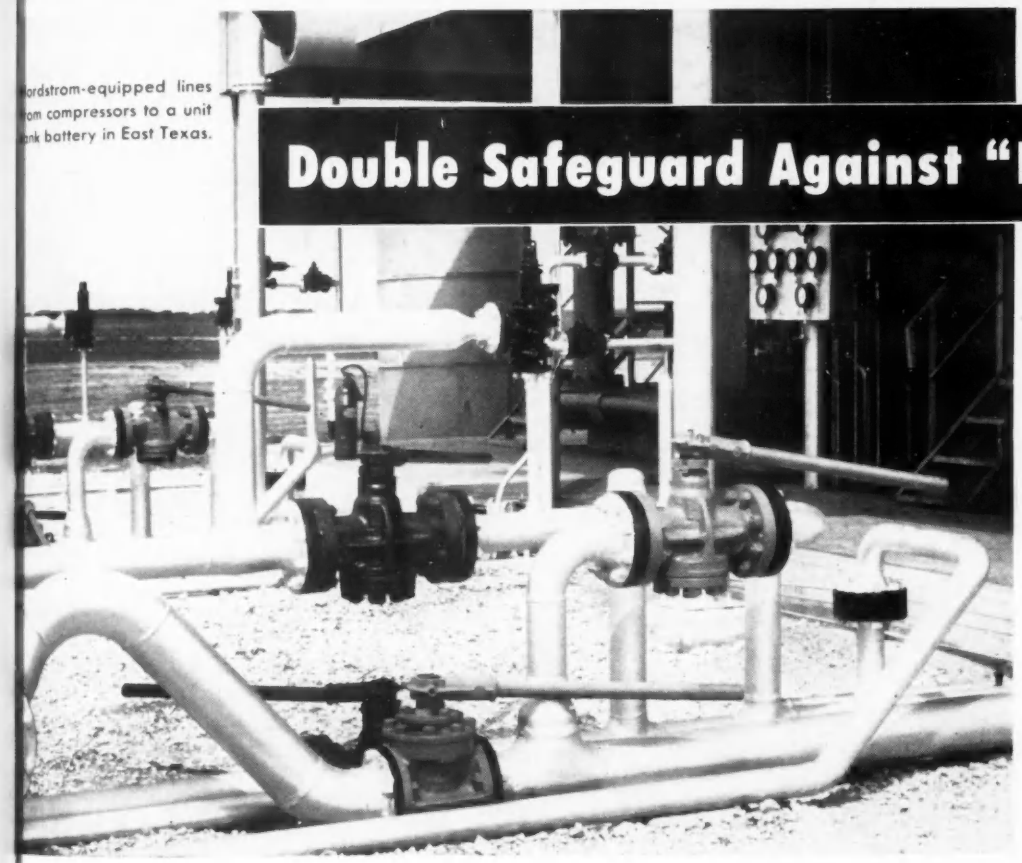

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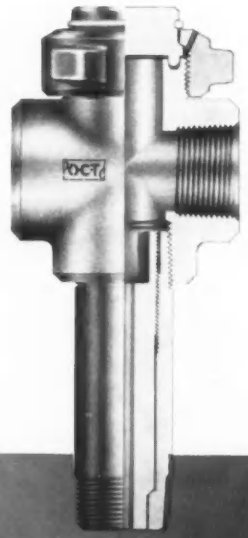

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Turn the page for quick guide to the articles in this issue.

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DON KLIEWER, International Editor
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ANTHONY GIBBON, Hunt Bldg., Tulsa 3, Okla.
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CHARLES WYATT, CLAIR BRYAN, JR., 3301 Buffalo Drive, Houston 6, Texas
D. S. CRAIG, Mgr. Advertising Service Dept.

CIRCULATION DEPARTMENT
R. M. DE SOMBRE, Manager

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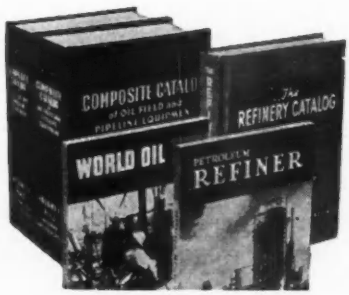

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WORLD OIL and The COMPOSITE CATALOG for the drilling-producing-pipe line industry
PETROLEUM REFINER and The REFINERY CATALOG for the refining-natural gasoline-petrochemical industry

A Quick Guide to

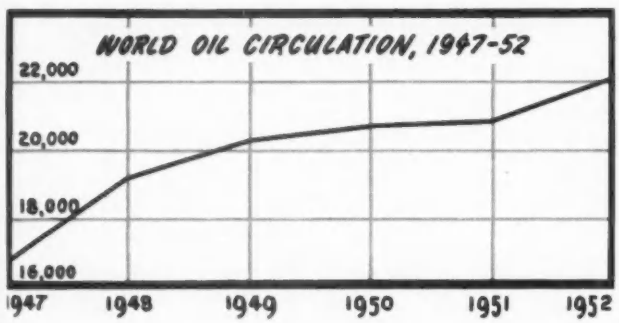
WORLD OIL this month . . . .

● Current Outlook

☐ **Who'll bear the brunt of new taxes** on natural gas in Texas? Tax increases are being considered in the Texas Legislature. Texas consumers would shoulder the burden for more than half of any new levies and the state's competitive position market-wise would worsen. There are other ramifications discussed, too, in an article beginning on **Page 76.**

☐ **Are you prepared for a bombing attack** by a foreign enemy? One company in Tulsa is. Others can benefit by its experience. This company has conducted an educational program among its employes and spent nearly $25,000 constructing a bomb shelter to protect its workers and hundreds of others besides. Find out how they have trained special squads in first aid, fire protection and other emergencies. **Page 78.**

☐ **Does Peron need pesos?** Will the recent trend toward foreign countries beckoning outside oil money, know-how and resources spread to Argentina? There is a possibility as the article on **Page 80** points out.



The WORLD OIL Story . . .

How do they like it? An oil man recently asked WORLD OIL's editorial director what effect the change (in 1947) from a weekly to a specialized monthly had made in our paid circulation. A checkup reveals a steady climb, from 16,638 five years ago to the current 22,001. This is a 32.23 percent increase! Categories showing most gain were: Engineers 60 percent and geologists 59 percent. WORLD OIL's Pipe Line circulation has increased 53 percent, and Producing circulation shows a 27 percent gain.

Yes, this proves that oil men have favored the change from *Oil Weekly* to monthly WORLD OIL. Specialized WORLD OIL has indeed become "The Blue Book of the Oil Producing-Pipe Line Industry."

☐ **The stage is set in Tulsa** for the International Petroleum Exposition, May 14-23. A special section of this issue of WORLD OIL is devoted to the show. And on **Page 81** is a look at what went into the making of this $100 million equipment and oil panorama and what the visitor to "The World's Fair of the Oil Industry" will see.

☐ **What volume of imports is needed** to insure American control over oil resources around the world? Just where the line should be drawn is a matter of major importance. See **Page 84** for a concise summary of how the imported oil rate is climbing and its impact on domestic industry.

☐ **What the oil company reports show.** Small companies, independent operators and drilling contractors with crude production of less than 10,000 barrels daily currently drill approximately 74 percent of the wells being completed in the U. S. They account for approximately 80 percent of all exploratory wells. Companies with refinery runs of less than 10,000 barrels per day account for about 13 percent of total crude runs to stills. These and other facts are revealed in a study of oil company annual reports by L. J. Logan, WORLD OIL associate editor. **Page 86.**

Use this condensed information on this month's principal articles. Run through these digests rapidly. ✓ Check those you want to read first.

● Exploration

☐ **What about the Illinois Basin?** Here's the play in a nutshell:

- The basin offers an excellent opportunity for independent operators and drilling contractors with limited resources.
- The territory contains extensive areas of undeveloped and unleased acreage.
- The rewards are not spectacular but neither are the risks and the odds favor "getting on the pipe line" in reasonably short time. See article on **Page 111.**

☐ **A new gravity approach** to reef interpretation is being used. Here's a description of field procedures and interpretive methods which have proven useful in mapping biocherms with gravity. A universal pattern has been established empirically which appears to hold true, regardless of core densities. **Page 116.**

● Drilling

☐ **Hundreds of ideas** packed into one drilling rig. Conventional design went out the window when two men sat down to design a rig which combines safety, efficiency and ruggedness. For the results, turn to **Page 147.**

☐ **What happened to the mud?** That's a common cry in oil fields where lost circulation is a drilling problem. Here's an article that tells where your mud was lost and suggests how these losses can be avoided or minimized. **Page 150.**

☐ **The winters are long in Western Canada.** From November through March the snowdrifts mount and the mercury tumbles to 60 degrees below zero at times. But drilling operations there are continuing the year round. For an explanation of just how these weather woes are being overcome, see **Page 160.**

☐ **How to cope with mud contamination.** Here's a discussion of the three most common types of contaminants—cement, gypsum or anhydrite and salt —and the methods for handling each type. This review can save you money. **Page 170.**

☐ **What are the trends in West Texas?** This conclusion of a two-part article on **Page 180** considers the future in West Texas operations and discusses among other subjects:

- Effect of hydraulic horsepower
- Chert vs. conventional bits
- Straight hole drilling
- Drilling equipment

Page 180.

☐ **How to pull a dry pipe . . .** and save money. Slug tanks built into mud tanks of drilling barges are saving money for contractors. The applications are many. Some operators have used it to kill wells . . . to spot water. It'll take you 60 seconds to find how to take a load off the pocketbook. **Page 186.**

● Production

☐ **Will that field-made flange joint hold?** Here are some facts on what makes ring joints seal and how erosion and corrosion can affect such seals. Because of the mechanics of flange joints made up on

christmas trees and blowout preventer hookups, it is essential that these joints be tested to assure a positive seal. **Page 201.**

☐ **Maintenance costs can be reduced** if corrosion due to salt water is a problem. Costs of repairs to vessels handling brine can be cut by proper cathodic protection. On 15 tests in central Kansas, average cost per installation for good protection was less than $3 per tank month. It was estimated that on a 210-barrel wash tank, cost of no corrosion protection ran $8 per tank month. A complete discussion of field tests, interpretation of results and recommendations in *Brine Corrosion of Steel Vessels*, **Page 206.**

☐ **Take guesswork out of flood evaluations.** Many stripper well operators are faced with the prospect of improving recovery through water-flooding. Will it work on your lease or field? For the facts on how radioactivity logging played a big role in providing a clear picture of an old Illinois field considered for water-flooding turn to **Page 216.**

☐ **How to select subsurface pump plungers.** Here are some practical suggestions on logical reasoning in choosing the type of plunger to give longer service with minimum maintenance. It's an article by Kenneth N. Mills, a nationally-known engineer who has specialized in oil well pumping problems. **Page 226.**

☐ **Are you losing precious oil . . .** to underground thief zones? If there are interbedding zones of clay, shale or silt in the productive interval, check the suggestions made in *Stop That Thief!* **Page 234.**

● Pipe Line

☐ **Repair shops on wheels** are United Gas' answer to dehydration plant repairs. United now has two of these custom-made mobile repair units in operation. For a word-picture story, turn to **Page 255.**

☐ **Largest crude line in operation.** North America's largest diameter and greatest capacity crude pipe line is now delivering 300,000 barrels a day from the Permian Basin of West Texas. And when stations now under construction are completed, West Texas Gulf's 26-inch carrier will be able to exceed 400,000 barrels daily. One of the most interesting features of the line is the Wortham (Texas) pump station. It's one of the world's largest. See **Page 256.**

☐ **The Map of the Month for May** features the United Gas System. United Gas serves major parts of Texas, Louisiana and Mississippi, extending to Mobile and other parts in southern Alabama and to Pensacola in northwestern Florida and the International Boundary at Laredo, Texas. **Page 264.**

● International

☐ **This is Talara . . .** the first of articles describing important oil camps or cities throughout the world. The first stop is Talara—Peru's leading oil town and also the country's most modern city. Is this combination more than mere coincidence? **Page 281.**

☐ **One of the hottest oil areas in Alberta . . .** that's what the general region southwest of Leduc is being called. Wizard Lake, an important 1951 discovery, has combined with three 1952 Devonian reef discoveries—Bonnie Glen, Pigeon Lake and Fiveland—to focus attention on the area. **Page 286.**

☐ **Interested in Peru . . .** and its operations under the new oil law? You'll find a discussion of exploratory wells, fields, secondary methods, reserves and taxation under the new law in the conclusion of a two-part article on **Page 288.**

● Exposition

☐ **What and where at the Exposition—**With this issue WORLD OIL has tried to bring the International Petroleum Exposition to our readers who are unable to attend and to supplement the visits of those who are in Tulsa May 14-23 with a comprehensive roundup of what will be on display and where. The special Exposition Section starts on **Page 297.** Other features—

- How to Get the Most Value from Exposition **Page 299.**
- Exposition Section Index **Pages 300-301**
- Reader Service Postcards **Pages 315-316**

Looking Ahead

What effect would the end of Korea fighting have on oil? Indications are that petroleum demand would not be affected appreciably. Neither would there be any cause for revision of drilling and development programs. Any effect of the conflict's end would be largely indirect. If business in general declined . . . oil demand would lag.

Pipe supply may be tight after materials controls end June 30. Independent operators fear some trouble getting supplies for wildcatting and development drilling. Pipe supplies likely will be tight in third quarter . . . but more adequate in fourth quarter due to increased mill production. Enough pipe for all needs can be best assured if supplies are taken for current use and not for inventory.

Natural gas industry is due to spend over $5 billion on expansion in five-year period (1952-1956), including $3 billion for transmission facilities. Investment will then be $14 billion, as total approached $9 billion in 1952. Industry already serves 21½ million residential customers in 43 states, generally at prices below those of other fuels, and present plans propose extension of service to nearly all remaining states.

The 1953 import picture for Pacific Coast region breaks down as follows: about 56,000 barrels per day of high gravity crudes from Far East and Middle East. From Sumatra (7,900 nautical miles) will come 37,500 daily average and from Saudi Arabia (11,400 miles) 18,500 daily. Limited volume may come from Caribbean area. Venezuela is 3900 miles from California, via Panama Canal, while only 1800 miles from New York City.

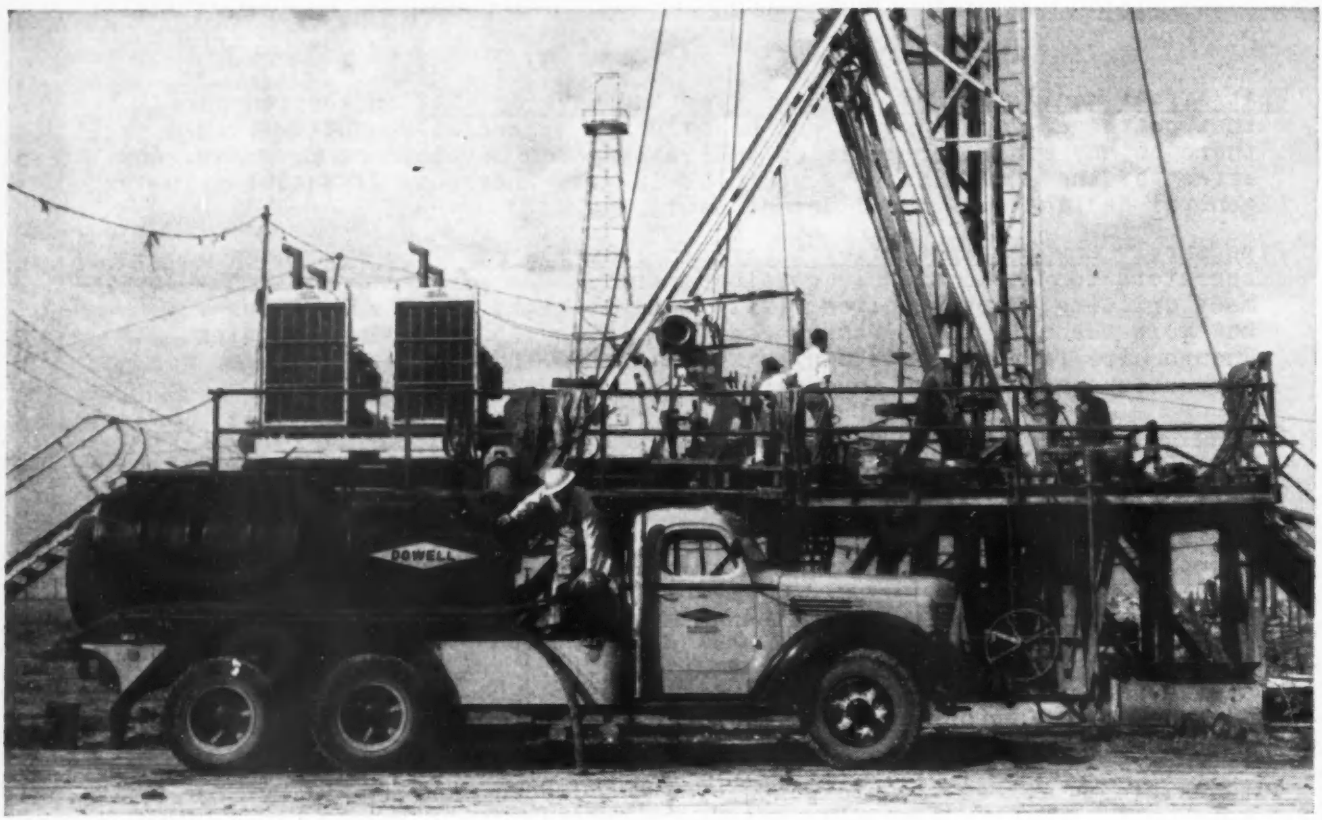
Outlook gloomy for American exports of oil equipment and machinery. Purchases of dollar equipment are being greatly curtailed in Middle East and other sterling areas, where dollars are hard to get. American oil companies operating in Middle East must sell oil largely for sterling, which cannot be converted to dollars. Hence they are cutting purchases of dollar equipment, setting up new offices in Europe, and transferring purchasing departments from New York to Western Europe. Some major U. S. concerns in Middle East will be operating entirely on sterling within a year or so.

Outlawing of collective bargaining on multi-employer or industry-wide basis, through a revised labor law, is advocated by some oil company executives. They declare that industry-wide bargaining remains a major goal of a coalition of various labor organizations. Labor leaders deny aims toward oil industry-wide unions such as those of mine and automobile workers. But they demand company-wide bargaining instead of present plant by plant negotiating, which they call "absurd," because of doing with many contracts what could be done with one contract per company. So far one major company, Sinclair Oil Corporation, has accepted a company-wide contract.

Taxes on Texas petroleum and natural gas would be increased under the "omnibus" tax bill (H.B.682) by Berry. Oil producers would pay $24.5 million more taxes annually and natural gas producers $3.5 million. Petroleum production tax of 4.6% of value would be raised to 5.25%, under a revised proposal by Berry, who originally proposed 5.6%. Gas would be raised from 5.72% to 6.72% of value. Total aim of bill is $82 million more revenue per year.

DOWELL MUD ACID OPENED UP CRITICAL ZONE

Well flowed 25 barrels of oil per hour after chemical treatment helped solve completion problem



Production suffers when the critical area of a well is blocked. Eliminating the blocking materials so that the well can flow freely often presents a major problem to oil producers.

Here's an answer! Dowell Mud Acid is a special acid solution that dissolves bentonite and similar silicate materials. It has been used successfully for many years to remove mud, mud cake, silicate materials and calcareous deposits from screens, slotted liners and formation pores.

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This is but one example. There are many others, where Dowell Mud Acid has spelled the difference between profit and loss. Results show that cement squeeze jobs are more often successful if Mud Acid is used ahead of the cement. And many operators use it to help free stuck drill pipe.

If you'd like to know more about Dowell Mud Acid, and if you're interested in learning more about Dowell's many other oil field products and services, be sure to contact your nearest Dowell office soon. Or, write directly to Tulsa, Dept. E13.

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FOR OIL INDUSTRY CHEMICAL SERVICE

Editor's Page

Water-Flooding Like Wildcatting

THE INDUSTRY NEEDS to come to think of water-flooding in terms somewhat similar to the way it views wildcat operations.

Oil operators do not expect all wildcat wells to discover production. They know many wildcats will be dry. Consequently, wildcatting is not condemned as an unprofitable operation and something to be avoided whenever they drill a dry hole. On the contrary, there has been a sharp growth in number of wildcats drilled by the industry despite a corresponding gain in number of dry holes completed and a rapid rise in cost of finding new oil.

On the other hand, too many operators seem inclined to expect every water-flood operation to be profitable. This is expecting too much. There will always be some unsuccessful floods, and operators should not turn their backs on water-flooding because some projects fail.

• • •

SUCCESSFUL WATER-FLOODING depends on a great many variable factors, which run the gauntlet from economics to highly complex and uncertain physical and reservoir characteristics. Despite greater technical skill today providing better advance determinations, unexpected reservoir conditions frequently are encountered. This is to be expected.

Each water-flood is still an individual proposition. Even in the great Bradford field, father of water-flooding, there have been unprofitable as well as profitable water-flood operations. The uncertainty of the effects of numerous variables always will enter the picture. The oft-repeated statement that the successful method of producing one oil well will be found to be inapplicable to its offset well is literally true in the case of water-flooding.

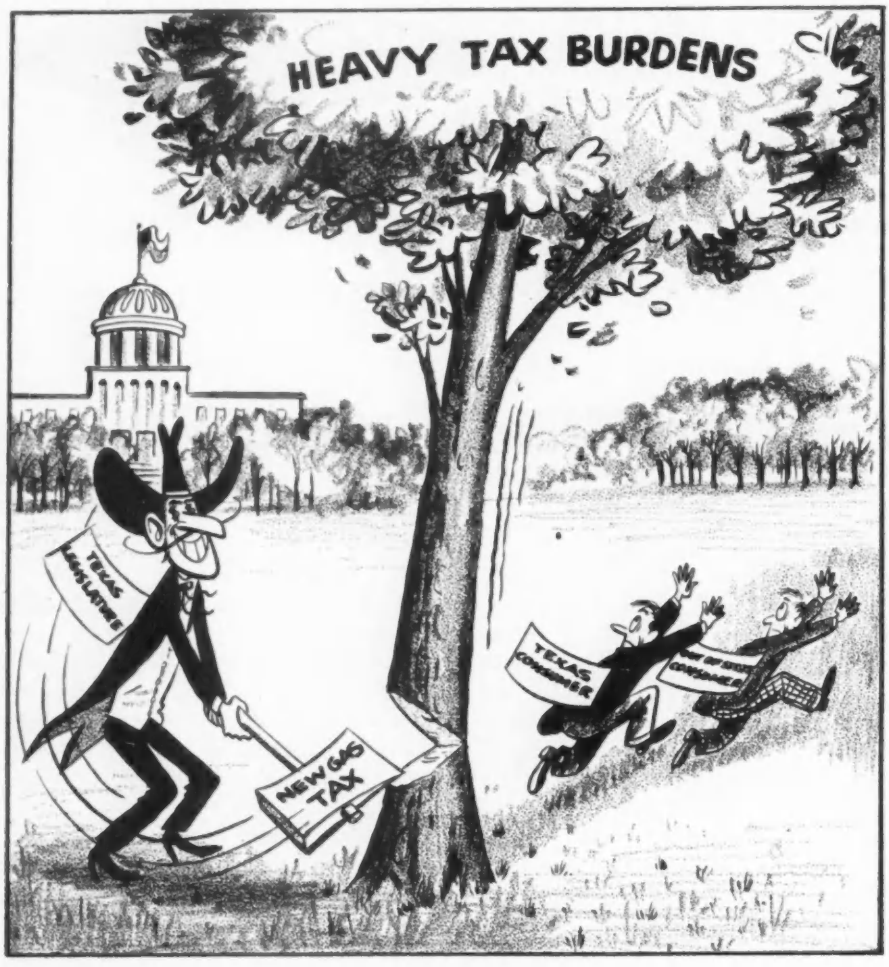
In the rapid growth of water-flooding operations during the past ten years or so, a good many have not been properly planned. Thorough investigation of conditions ahead of time by experienced and capable engineers could have reduced the number of failures. However, even with the best engineering advice, so many variable factors are involved that failures will never be eliminated completely.

• • •

THEREFORE, SOME FAILURES here and there along the line should not be permitted to discourage the application of water-flooding. Such must be recognized as inherent water-flooding hazards or gambles, and operators must avoid judging all floods on the basis of their failures.

The industry must expect to encounter some unprofitable flooding operations, just as it anticipates dry holes when wildcatting.

Warren L. Baker



Higher Taxes On Texas Gas Are Not Advisable

New levies would hit home-state consumers and worsen the state's competitive position.

TEXAS GAS is taxed more severely than that from some of the states competing with Texas for markets.

Texas consumers pay more than 50 percent of total levies on their state's gas.

These are two of the major reasons why producers and pipe line companies operating in Texas are concerned over the threat that heavy new taxes may be imposed on Texas natural gas by the state legislature. And proposals to fix by law minimum prices of gas at the wells have drawn strong disapproval.

Bills for levying new taxes have been introduced while doubt remains as to validity of the newest existing tax, applying to the gathering of gas by pipe line companies.

Including the gathering tax, Texas natural gas currently is taxed at a rate of about 12 percent of its value. Among the tax bills now before the legislature is House Bill 460. It would levy an additional tax on production of natural gas amounting to 2 cents per thousand cubic feet, equivalent to 28 percent of the value of the gas. That addition would put the total tax on gas produced in Texas up to 40 percent of its value.

Several other measures imposing greater taxes on Texas gas have been introduced at the current legislative session.

Enlarged levies on natural gas would be grossly discriminatory, as some other natural resources with total annual value of $500 million pay no special state taxes whatever.

Tax Already Heavy. Even at the present rates, Texas gas is taxed more severely than that from some of the other states that compete with Texas for markets. If additional taxes are imposed on it, Texas gas will be placed at serious competitive disadvantage.

Much of the agitation for higher taxes on natural gas has been of a "Texasistic" concept, aiming to discourage exportation of Texas gas to other states and to "save" it for use in Texas. Under the U. S. Constitution, Texas cannot legally interfere with free movement of Texas gas into interstate commerce. The state cannot lay any special tax on gas going out of the state. When the gas gathering tax was enacted, therefore, it applied on all gas. But helping to assure passage of the law was the argument that the tax would be borne largely by out-of-state consumers; that if the tax was high and retarded exports, there should be no regrets, as gas would thereby be saved for use in Texas.

In this argument there were serious errors in conclusions reached. Actually, any tax on Texas gas falls heavily on Texans because Texans themselves are such large users of their gas. While Texas produces half the natural gas consumed in the U. S., it also consumes almost one-third the nation's production. Of the gas produced in Texas, over one-half is used in Texas. Texas consumers therefore carry over 50 percent of the total tax burden on Texas gas. All Texas users must pay the full amount of any tax in effect. If the tax is so high as to discourage use outside the state, it will also discourage use within the state. Texas industries would have to pay the full tax, while out of state industries using gas from other states would pay little or none of the Texas tax. Using the tax to influence competitive advantage or disadvantage, the Texas legislature would seriously abrogate the advantage sought by industry in Texas.

Price fixing proposals would have the same effect as excessixe taxes, aside from being another unfortunate manifestation of the "government in business" philosophy. Under proposed legal minimum prices for natural gas, Texas consumers would pay the bill for almost $80 million in added revenue for only 30 major gas producers.

Economy Move. While bills seeking to raise the taxes on Texas gas are

being given consideration, there is apparent a tendency toward economy among many members of the legislature. Some of them feel that added taxation may not be necessary or advisable. State Comptroller Calvert has announced that prospective revenues under existing tax laws for the period ending August 31, 1955, are within $20 million of needs based on present levels of appropriation. If the decision of the State Court of Appeals upholding the validity of the gas gathering tax is not reversed, the revenue from that source alone should far exceed this sum.

The present taxes on natural gas produced in Texas include a production tax of 5.72 percent of the value of the gas and the gathering tax of 9/20th of one cent, which is equivalent to 6.43 percent of the value of gas sold at seven cents per 1000 cubic feet, the estimated average price currently received.

As stated above, House Bill 460 would levy an additional tax of two cents per 1000 cubic feet on production of gas, equivalent to 28.57 percent of the value of seven-cent gas, making the total 40.72 percent of value.

An "omnibus" tax bill (the Berry bill), affecting various other sources of revenue as well as gas, would raise the production tax on natural gas from 5.72 percent of value to 6.72 percent of the value of the gas. Committee hearings on this bill started early in April and were expected to continue the remainder of the month.

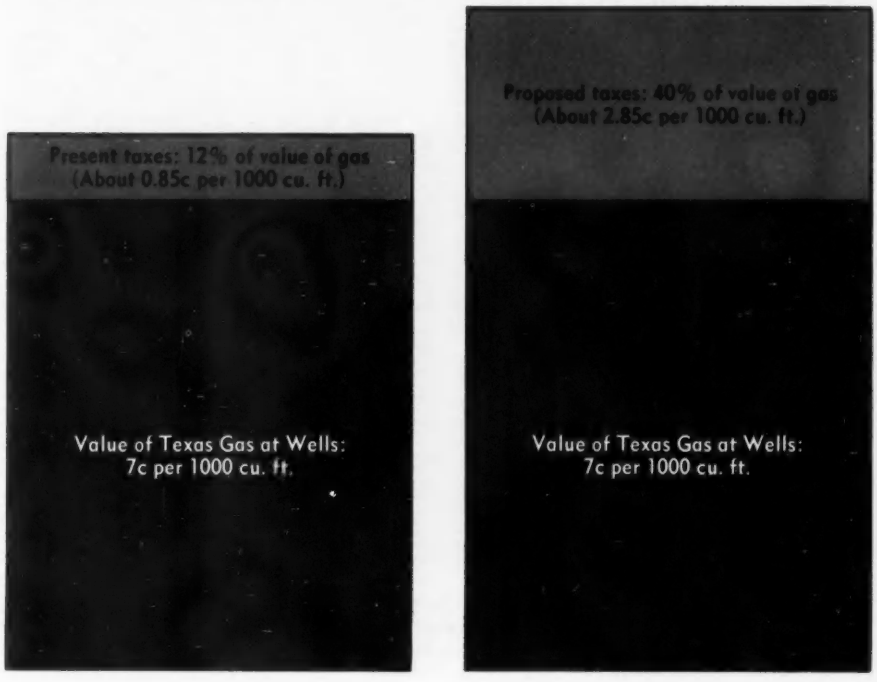
House Bill 2 by Representative Dolph Briscoe of Uvalde proposes an annual tax of $60 per horsepower capacity on engines driving compressors for gas movement in all pipe lines.

Under the present production and gathering taxes, Texas in 1952 collected revenue from natural gas amounting to an estimated $29.4 million dollars. Although the gas gathering tax is being contested in the courts, it actually is being paid into the state treasury. Having been sustained in the Court of Appeals, the tax will be tested further through appeal to the Texas Supreme Court. It is a tax on the occupation of gathering gas.

While the production and gathering taxes on natural gas are equivalent to 12.15 percent of the value of the gas, the tax on producing sulfur is $1.40 per long ton or about 8 percent of the production value, and the tax on producing crude oil is 4.6 percent of value.

Texas Consumers Would Pay Heavily

Proposed raise would make tax on Texas natural gas more than three times present taxes and equal to 40 percent of value of the gas. Texas consumers would pay a greater part of the tax than users in all other states combined since 53 percent of the gas produced in Texas is used in Texas.


Present taxes: 12% of value of gas
(About 0.85c per 1000 cu. ft.)
Value of Texas Gas at Wells:
7c per 1000 cu. ft.
Proposed taxes: 40% of value of gas
(About 2.85c per 1000 cu. ft.)
Value of Texas Gas at Wells:
7c per 1000 cu. ft.

Out of $225,484,051 collected by the state of Texas in 1952 in the form of business and property taxes, $152,723,688, or 67.73 percent, was paid by these three natural resources: oil, gas and sulfur. Of all taxes and licenses collected last year, these three natural resources paid 34.03 percent, or $152,723,688 out of a total of $448,773,985.

States that compete with Texas for natural gas markets include especially Oklahoma, Kansas, Louisiana and California.

Oklahoma . . . collects a gross production tax of 5 percent of the gross value of gas (and oil) plus a gas excise tax of 2/100 of 1 cent per 1000 cubic feet.

Kansas . . . imposes a tax of ½ mill per 1000 cubic feet to apply on the cost of conservation of resources.

California . . . levies a severance tax on gas and oil, determined annually, to cover conservation costs.

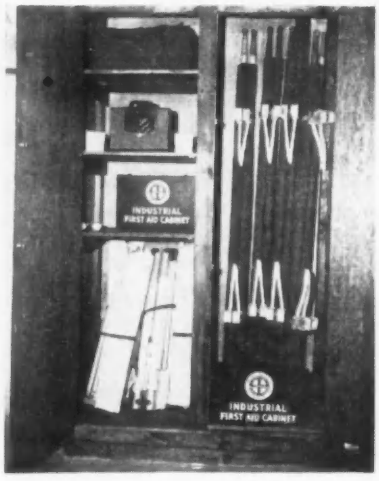
Louisiana . . . a state of generally heavy taxes, imposes several taxes on natural gas. It has a severance tax of 3/10 of 1 cent per 1000 cubic feet and a gas gathering tax of 1 cent per 1000 cubic feet. These two taxes, totaling 1.3 cents per thousand cubic feet are equivalent to 18.57 percent of the value of the gas, on the basis of 7 cents per 1000 cubic feet. Louisiana also collects a franchise tax on corporations transporting natural gas by pipe line, based on gross receipts, the rate being 1 percent. On the use of electrical or mechanical power, Louisiana levies an annual tax of 50 cents per horsepower of capacity.

Mississippi . . . imposes a severance tax on natural gas of 6 percent of value or 3 mills per 1000 cubic feet, whichever is greater, and an additional tax of 1/10 mill per 1000 cubic feet to pay for administering oil and gas conservation laws.

Arkansas . . . has a severance or production tax of 3/20 of 1 cent per 1000 cubic feet of gas and levies a conservation tax of ½ mill per 1000 cubic feet.

New Mexico . . . has a severance tax of 2½ percent of gross value on gas and oil, a gross income tax of 2 percent on the occupation of producing natural gas or oil, and an oil and gas conservation tax of ⅛ of 1 percent of proceeds. In New Mexico the owners and operators of gas and oil wells pay a tax on production in lieu of all other property taxes on such wells; the rate being same as other property in county, based on ½ market value of product.

Inspecting first aid kits in Jones and Laughlin Supply Company's air raid shelter are, left to right: Douglas E. McCormick, Jones and Laughlin's personnel manager and director of the Civil Defense program; Miss Frances Earle, first aid team captain; Miss Myrtle Nenninger, a member of the first aid squad, and Ray Curtis, assistant maintenance engineer.



Closeup of well-stocked Civil Defense cabinet. Behind cabinet on left are fire extinguishers.

If 'the Bomb' Strikes . . .

. . . Tulsa Plant Is Ready

Entrance into the largest Jones and Laughlin air raid shelter is a steel door so constructed that it cannot be blown inward by concussion from outside. Civil Defense Chief McCormick descends to shelter.

This is Jones and Laughlin's largest air raid shelter. Located in basement of one of major plant buildings, it is used for storing permanent records. Roof is protected by nearly 20 inches of reinforced concrete. In an emergency, it can shelter 600 persons.

By ROGER V. DEVLIN
Tulsa Tribune, Tulsa

Auxiliary electrical system sufficient to operate emergency lighting, ventilating fans for the air raid shelters, public address and intercommunication systems. It is kept constantly charged against any emergency.

CIVIL DEFENSE leaders throughout the country are finding it difficult to overcome an indifferent "it can't happen here" attitude in industry and among the people, generally. This is particularly so in the Mid-Continent area where there is a sense of security due to distance and the feeling that the bastions of mountains and seas make it less vulnerable than coastal areas.

However this may be, there is one Tulsa plant that has prepared itself for any emergency.

That one plant is a startling and amazingly well-prepared exception. It has set up an elaborate air raid alarm system, together with emergency communications facilities.

It has trained many of its nearly 300 employes in rescue, fire and first aid work.

It has spent between $20,000 and $25,000 converting space into a bomb shelter large enough to protect its own employes and hundreds of other persons. The shelter is equipped with emergency water supplies, ventilation, heating and electric power.

And, most important, every employe in the plant has been trained in exactly what he or she should do if an air raid siren screams, and that training has been reinforced with practice.

The exception to the indifferent attitude is the Jones and Laughlin Supply Company, 108 North Trenton Avenue, in Tulsa, distributor of oil field supplies, and subsidiary of Jones and Laughlin Steel Company.

The company's civil defense director is Douglas E. McCormick, personnel manager who hopes "it will never happen here" but if it does "we are prepared!"

Jones and Laughlin Supply Company, at the instigation of its civil defense conscious parent company back east, began checking into its protection facilities more than a year ago and, as in the case of scores of other industrial organizations, found them virtually non-existent. Worse, it found that the average employe had a complete lack of appreciation of what civil defense meant.

To handle the first, the company started a building and remodeling program. To meet the second challenge, it started an education campaign.

Beneath one of the major plant buildings was a large, L-shaped basement. The floor over it was of light concrete. Its doors were also light and it had a series of unprotected windows.

Today, the entrances have been protected. Windows have been bricked in. And nearly 20 inches of reinforced concrete is overhead.

The basement has been equipped with emergency ventilation fans, with a public address system, with cabinets holding stretchers, cots, battery-operated radios, flashlights and first aid supplies.

A large steel tank preserves a supply of emergency fresh water.

The basement area is not designed solely as an air raid shelter, since the available space houses the company's permanent records. In an emergency it can provide shelter for an estimated 600 persons.

In another nearby building and also heavily protected, is a five-kilowatt emergency power plant. The room housing it also can be used as an air raid shelter and it has its own water supply, first aid equipment and other disaster needs.

In every hallway in the main office building, as well as in warehouses, bright red arrows and the designation "Air Raid Shelters" have been put up.

The educational program started at the same time as the remodeling began. In order to stimulate the employes' interest the company purposely withheld any publicity on what was in progress. Then management let it be known, quietly, that a bomb shelter was being constructed and the news spread more effectively than if it had been announced on the bulletin board.

Next the company set up a 22-week Red Cross first aid training course. A selected group of employes took the training on company time. It also set up a parallel training program in the prevention, detection and handling of fires and organized the trainees into squads stationed at all important spots in the plant.

Jones and Laughlin now has eight fully-qualified rescue and first aid squads and seven fire teams. They not only have been taught their own specialty but also how to work together.

Even more important, every employe—from President J. L. Shakely on down—has been trained in exactly what he should do in case of an alarm. They have been instructed to walk, not run, to their shelter stations; to avoid talking so as to reduce confusion; to avoid smoking so there will be less chance of a fire.

"Then," said Defense Director McCormick, "after giving the plant advance warning, we held a practice air raid drill. Less than three minutes after the siren first sounded the plant was evacuated. All first aid, fire and rescue squads were at their stations. All other employes, including the top officials, were safe in the shelter. A few minutes later the 'all clear' signal was given and employes returned to work."

The whole operation had taken but 14 minutes.

Is Argentina Calling For Private Capital?

Reports indicate the government has failed to find and produce that country's natural resources.

THE SIMPLE FACT behind the reported plan of President Juan Peron to open the doors of Argentina to private foreign capital development—particularly petroleum and mineral resources—is that the Argentine government has failed in its attempt to find and produce its natural resource wealth.

President Peron launched the nation's second five-year plan at the start of 1953 which calls for the investment of 33.5 billion pesos ($2360 million) in industrial and agricultural development by 1957. Economic advisors reportedly have told President Peron that such an ambitious plan cannot be put over without help from foreign companies. Especially recommended was a proposal to encourage private foreign capital development of petroleum and mineral resources.

Four private capital oil companies—Astra Cia. Argentina de Petroleo (Argentine capital); Cia. Rio Autel "El Sosneado" (Argentine capital); Diadema Argentina S.A. de Petroleo (Royal Dutch-Shell Group); and Standard Oil Company S.A. Argentina (Standard Oil of New Jersey) produce oil in Argentina, but their operations are extremely limited.

Present Argentine petroleum regulations, which date back to the 1935 Mining Code, prohibit private capital companies from acquiring additional acreage for exploration unless under a jointly-owned company with the government. Under such restrictions field work and production of crude have been progressively reduced.

The largest producer in Argentina is the government-owned company, Yacimientos Petroliferos Fiscales. While YPF has shown a slight rise in its production annually in recent years, the drilling program of the government company has not been on a scale in keeping with Argentina's needs for domestic production.

The nation's output is shown in Figure 1. And while some increase has resulted each year, demand has jumped from 63 million barrels in 1950 to an estimated 72 million barrels last year. The actual increase in demand probably would have been much greater if rationing had not been enforced by the government—a move designed to curtail imported oil and save foreign exchange.

YPF's extremely limited exploratory program over the past three years has resulted in four oil field discoveries, classified by qualified observers as "major" finds. These results give some indication to the potential underground petroleum resources which could be developed if an adequate exploration campaign were undertaken—or permitted. The most important 1952 oil discovery by YPF is the Cerro Bandera field, west of Plaza Huincul in Neuquen territory. Numerous development wells have been completed in the field and a six-inch pipe line with an estimated capacity of 12,000 barrels daily has been placed in operation.

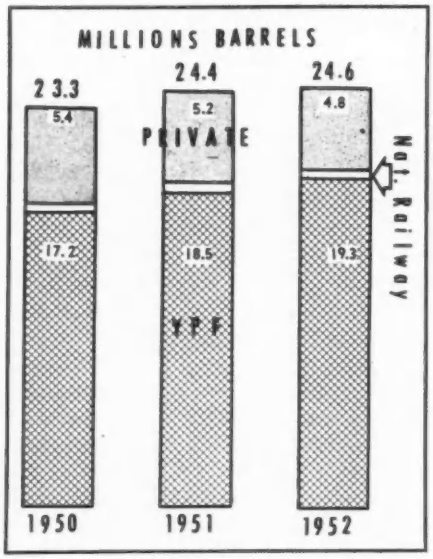


FIGURE 1.
Argentina's crude oil production has shown only insignificant increases in the last three years, all of which has been accounted for by the government-owned company, Yacimientos Petroliferos Fiscales. During the same period the volume produced by private companies has declined steadily as has the output of Cia. Ferrocarrilera de Petroleo (National Railways). Once privately owned by British interest, the company was absorbed by the national government of Argentina in 1948. National Railways production (not shown) was 742,239 barrels in 1950, 598,128 barrels in 1951 and 518,738 barrels in 1952.

Production from the new discoveries will help Argentina's domestic supply considerably, but there is much to be done if the nation is to approach self-sufficiency in oil and end the drain on its teetering economy to pay for imported crude and refined products. WORLD OIL estimates Argentina's underground crude oil reserves at 300 million barrels, though competent geologists believe the potential reserves existing, but unproved, in Argentina are considerably above this estimate.

Peron reportedly was encouraged by the rush of foreign companies to obtain petroleum concessions in Peru following the latter nation's decision to ease its restrictions on foreign capital petroleum development. To encourage present petroleum producers in Argentina as well as possible new entities to invest the necessary funds for a broad exploratory program, the Peron regime will have to be prepared to give definite assurances for the protection of private investments in the country.

Such would represent a sharp departure from the form of decree rule that has been in effect in Argentina under Peron in recent years to keep the nation's financial crisis from bringing complete chaos.

Argentine Crude Oil Production by Provinces
(Barrels)

	1952	1951	1950
Caleta Olivia	2,772,058	2,426,927	1,391,308
Comodoro Rivadavia	14,164,945	14,767,542	14,737,791
Nuequen	2,671,430	2,254,918	2,535,552
Mendozo	4,387,894	4,031,752	3,892,843
Salta	661,051	926,044	804,207
Total	24,657,333	24,407,183	23,361,701

Crude Oil Production by Companies

	1952	1951	1950
Y.P.F.	19,332,121	18,548,505	17,230,046
Diadema Argentina	3,162,039	3,396,964	3,450,695
Astra	1,144,231	1,273,222	1,278,379
Cia. Ferrocarrilera	518,738	598,128	742,239
Standard Oil	493,336	582,910	652,239
Rio Autel	6,868	7,454	8,103

Tulsa Is Ready for the Oil Show

- **A peek at the past and a preview of the miracles to come.**
- **It's costing nearly $10 million to stage it.**
- **1484 exhibitors will display latest in field equipment.**
- **A trip to the IPE is a refresher course in petroleum industry operation.**

THE DRAMA of oil will be unfolded during the International Petroleum Exposition in Tulsa, May 14-23.

A complete display of the vast range of equipment now used in the industry; a reminder of oil fields as they used to be; and a preview of miracles to come are being assembled by more than 1200 companies for the $100 million equipment and oil panorama—"The World's Fair of the Oil Industry."

The scope of the exposition is described by the fact that it is costing nearly $10 million to stage it. The exposition itself has spent $250,000 in advance preparations, including two new exhibit areas. The exposition's 28-acre plant and grounds will accommodate 1484 exhibitors, largest number in its 30-year history.

The sweeping array of exhibits will include 147 in the exploration field, 363 for drilling, 390 production, and 365 pipe line.

At the originating point in the Hall of Science, a multi-colored geologic time table will recreate the structural growth of an area, and individual exhibits will feature outstanding oil areas.

Remarkable advances in seismic, gravity and magnetic equipment for measuring and recording the arrangement of underground strata will be displayed, along with units designed to determine and chart radioactivity and electrical resistivity of the earth's formations.

Developments in drilling, well completion, corrosion, various pumping methods, reservoir performance and conservation will depict the vast technological progress made since the 1948 exposition.

Virtually every means of transporting oil in its crude or refined state will be demonstrated to Hall of Science visitors. Miniature models, and an actual microwave system in operation will offer industry observers and laymen a glimpse of some of the most noteworthy innovations adapted by the industry in recent years.

The Hall of Science will house the phenomenal accomplishments of applied science in all phases of the petroleum industry. These advances will be dramatically portrayed, both in the Hall of Science and the company exhibits.

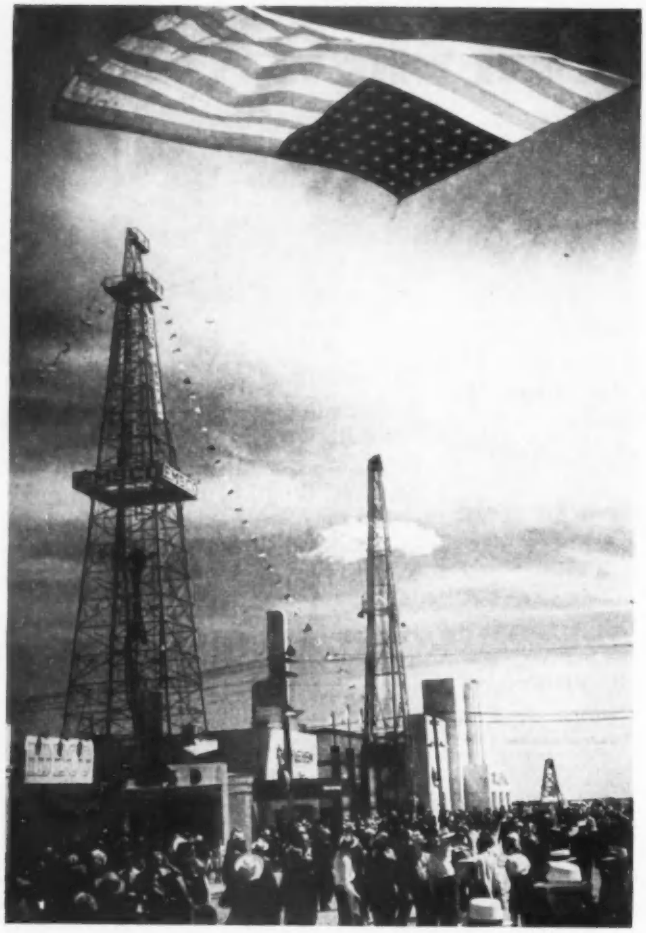
Nomads Active. The fabulous collection of products is expected to attract visitors from around the world. Many firms in the industry have made arrangements to send official representatives to absorb the educational benefits of the most complete "short course" in petroleum ever offered. Exposition officials have predicted that representatives from at least 50 nations will attend the show. In number of representatives, foreign attendance is expected to double the record established at the 1948 show. Upon arrival in Tulsa, these delegates will find the "welcome mat" spread for them. The NOMADS organization, under the coordination of Harry E. Estes of Houston, executive secretary of the National Board of Regents, has made elaborate plans to receive visitors and assist them in every possible way. NOMADS members from the various chapters in New York, Los Angeles, Houston, Dallas-Fort Worth, and Tulsa have established working committees which have completed the details of the program. Registration headquarters for visiting international delegates will be located in the NOMADS building on the exposition grounds.

Housing the anticipated throng of visitors is a monumental task that will be accomplished by using private homes and private rooms. Visitors arriving at the last minute will be able to locate a comfortable place to sleep by communicating with the IPE Housing Bureau at 12 West Fourth Street in Tulsa.

Among the special features scheduled during the show is a commemorative ceremony honoring the founders of the petroleum industry. To take place near the replica of the Drake Well, on the exposition grounds, this event is a tradition originated by John D. Rockefeller, Sr., at the 1927 show.

Held in honor of the industry's old-timers, the ceremony will recognize a "Pioneer of Pioneers" in oil activity, and a "Grand Old Man" from each of six major industry divisions. An Old-Timers Committee has received names of candidates from many oil areas, and selections of the honorees will be announced, and awards presented, on Old-Timers' Day, May 17.

Among the organizations committed to be well represented at the show are the Desk and Derrick Clubs of North America. This will be the first exposition in which women in the industry will participate in this capacity, since the groups were organized since the 1948 show. They are participating in the program, too. An essay contest on



Scenes Like This will be repeated at the IPE in Tulsa. Crowds like this helped set the 300,000 attendance mark at the 1948 show. This is Drake Drive, called "Supply Row" because of the large number of supply company exhibits facing it.

Model Man. Dallas Meade, one of the many exhibit builders, works with clay models of an 80-foot oil field worker being erected on one of the exhibit areas.

. . . this is the Oil Show

The International Petroleum Exposition grounds in Tulsa was a beehive of activity as the May 14 opening drew near. The exposition staff was busy answering every need of the more than 1500 exhibitors . . . so that innovations in oil field equipment and technology could be dramatically displayed. The exhibitors were rushing their projects to completion . . . and awaiting the opening of "the greatest oil show on earth."

Down Here. Workers rush assembly of a heavy-duty pumping jack weighing 27,000 pounds. New and improved models of virtually every type of production equipment will be displayed.

Wired for Action. More than 40 miles of electric wiring will provide exhibitors with power to operate machinery. Facilities are capable of handling normal electric consumption for city of 100,000.

Up There. A job foreman stands on drawworks housing as he directs work on a drilling rig exhibit. More than $100 million worth of equipment will be displayed on the 28-acre IPE grounds.

"Why My Boss Should Send Me to the Oil Show" has been under way since early this year, and more than 500 entries have been received. The winner will receive a round-trip visit to the exposition, with expenses paid by the show management.

An "Oil Woman of the Year" is to be selected by a panel of industry executives. Nominations have been submitted by most of the individual clubs, and the "First Lady of Oil" will be honored at a banquet May 16.

The Tulsa chapter of D & D is especially active. Members will be in information booths at the municipal airport, Union Depot, Union Bus Terminal, lobby of the First National Bank, and the lobbies of the Mayo Hotel and Hotel Tulsa. These will be opened two days before the exposition opens and maintained during the ten-day run.

Special days have been named by W. G. Skelly, president of the IPE, to honor divisions of the industry, oil trade associations, oil centers, and the oil- and gas-producing states and countries. Many groups have prepared special programs for presentation on their respective days.

A 25-block-long downtown parade of new oil industry equipment will be held May 19 under the auspices of the Petroleum Motor Transport Association. After touring the downtown area, the parade of portable and semi-portable equipment, developed since the last show, will proceed to the exposition grounds, where demonstrations will be held to simulate actual field operations.

Visitors to the twice-expanded exposition plant will find a multitude of significant innovations. Even the streets in the north and west additions to the basic plant have been assigned new and familiar names. In the north area, there is Burgan Street, Barco Boulevard, Avenida Maracaibo, Talara Drive, Trinidad Trail, Schoonebeek Lane, Dukes Wood Lane, LeDuc Drive, Redwater Road, and International Avenue.

New names in the west area include Permian Basin Plaza, Rocky Mountain Road, Calle Nuevo Mexico, Scurry Street, Williston Way, Unita Lane, Diesel Drive—and Gasoline Alley.

The Oklahoma, Kansas, Texas, California and Technical buildings, as well as the Hall of Science Building, have all been refurbished. All 883 sheltered booths have been painted and necessary utilities installed.

New Buildings. Exhibitor-owned structures have also undergone extensive renovation, and many new buildings have been erected in the two new exhibit areas which were added especially for this 30th anniversary event. More than 50 exhibitor-owned buildings are being utilized to house displays.

Of the many firms throughout the world's oil industry who will be represented at the exposition, only a few will give their representatives formal instructions as to reports on what they see.

A great many have adopted a plan similar to that of Socony-Vacuum Oil Company, which, with its affiliates, will have 14 or 15 representatives, including equipment engineers, drilling superintendents, and production managers. Six of the top men will be at the show the full ten days, and others will visit in two groups, each for a five-day period.

According to R. L. (Red) Foster, chief equipment engineer, the value derived by Socony people from the show is in inspecting equipment that "will reduce operating costs for various operations." At the end of each day there will be group discussions of the equipment seen.

California-Texas Oil Company will have six engineers at the exposition who will pass their new information to men in the field.

The foreign affiliates of Standard Oil Company (N. J.) will have 68 in attendance, nearly all of them engineers or administrators. For the most part, they will be window shopping for equipment suitable to their operations and will have no specific assignments as to what equipment to see.

The Union Oil Company of California, which usually sends 12 to 15 representatives, requires no written reports but depends on the trade magazines for details of the show. Union believes it valuable to have personnel on the ground to contact equipment company personnel.

Drilling contractors will be well represented. Many delegations will include two men from the management level, two drilling superintendents, and two assistant superintendents.

A great number of firms are making no definite plans for representation, but will await the pressure of work to determine who, and how many, will attend.

Great Opportunity. But as to the value of the exposition, oil men agree with John W. Brice, president of The Carter Oil Company, who believes that attendance at the show constitutes a compact refresher course on the world's oil industry.

"I base my opinion," he said, "on the fact that attendance at the show with its opportunity to view and study the latest in tools, equipment, machinery and services demonstrated, to talk with manufacturers and sit in on conferences with others seeking more efficient and economical operation of the oil business, is a wonderful opportunity to learn a great deal in a short time."

That visitors may expect one or more significant innovations is vouched for by the record. According to W. B. Way, general manager of the show, at least one major revolutionary device or method has been introduced to the industry at each of the expositions since its beginning in 1923. By bringing together in one place all the newest methods and ideas, the exposition has furnished oil and gas men with the opportunity to compare and select those most worthwhile.

Going to the Big Show?

. . . then save yourself some time by turning back to the Exposition Section of this issue and looking over the list of products to be exhibited. Pick out the equipment that interests you most, note its location on the exposition grounds, and see it first.

Ask WORLD OIL for a copy of its handy classified directory of equipment on display, which will enable you to see who is exhibiting any type of equipment in which you may be interested. The directory also contains a foldout map of the exposition grounds.

Too Busy to Go?

. . . then turn back to the Exposition Section, for we have brought the show to YOU.

In either case, use the handy postcard to obtain full details on the exhibits.

Further details on the above helpful services are given on pages 315 and 316.

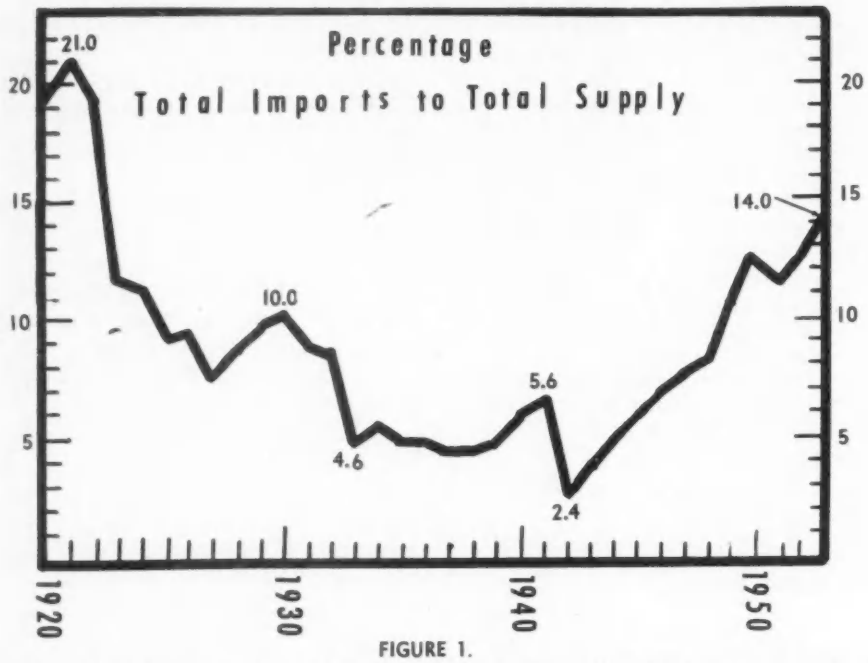


FIGURE 1.

Total petroleum imports into U. S. in 1953 are expected to average 1,038,000 barrels daily—about 14 percent of total U. S. supply. This will represent the highest percentage since 1922, when imports accounted for 19.2 percent of U. S. supply. The U. S. has become a net importer of petroleum since 1948. Previously the nation had been a net exporter since 1923. (Source: Bureau of Mines data.)

Imports vs. American Control of Oil Resources

Trend points to rising imports and declining exports, making foreign trade a one-way street.

ROBERT E. SPANN, WORLD OIL Staff

WHAT VOLUME of imports is needed to insure American control of oil around the world?

Currently, an equitable solution to the ticklish problem of the "peril point" of U. S. tariffs—where too large an import volume damages domestic industries and where too small a volume hurts the economies of allies abroad—is the goal of the Eisenhower Administration-sponsored study of the nation's foreign trade policy.

A compromise also will be attempted between the divergent views within many industries on the permissible level of imports. Within the oil industry, for example, producers outside the U. S. and fuel oil dealers on the East Coast have sharply contrasting opinions with domestic producers and state governments dependent on revenues from oil severance taxes.

Pending completion of this long-range study, Congress has the immediate problem of enacting tariff legislation to take effect with the expiration of the Reciprocal Trade Agreements Act on June 12 if import duties are to continue. President Eisenhower has recommended a one-year extension of the present law. Two bills applicable to petroleum import issue have been introduced, both differing with the Administration view. One bill by Rep. Richard M. Simpson (R.-Penn.) would extend the present tariff law, but would tighten it considerably in favor of domestic industry. Among other provisions, the bill would restrict total petroleum imports to 10 percent of domestic demand and would limit residual fuel imports to a 5 percent quota.

Sen. Frank Carlson (R.-Kansas) has proposed a flat 10 percent limitation on imports of petroleum with the provision it could be lifted should an oil shortage develop. There will be much opposition to such limitations both from within the country and abroad, particularly the proponents of greater foreign trade.

To the petroleum industry, the united chorus of "Trade, Not Aid," as foreign nations plan it, means increased imports and declining exports for U. S. producers. The nation will continue to be a net importer of petroleum, its position since the end of 1947, with net imports continuing to rise annually. The excess of petroleum imports over exports has bounded up sharply from a balance of 146,600 barrels per day in 1948 to 520,000 barrels daily in 1952. If early estimates prove correct, the net import position in 1953 will average 685,000 barrels a day, a new high.

Planned imports in 1953 will average 1,038,000 barrels daily of crude oil and refined products, constituting 14 percent of the total U. S. petroleum supply. This would represent the highest percentage of imports to total supply since 1922, when the imported volume accounted for 19.2 percent of supply. The 23-year trend of the percentage of supply made up of imports is traced in Figure 1.

A long range rising trend of U. S. net oil imports is indicated definitely by rapidly mounting production in the Middle East and the Far East and the probability that in the foreseeable future Canada will reverse its position and become a net exporter of petroleum. At the same time, these increases in productive capacity around the world, together with increased refining facilities in consuming nations, mean a diminishing dependence of other nations on U. S. petroleum exports.

Barring the unforeseen, the U. S., which exported an average of 435,810 barrels of petroleum per day in 1952, will experience a sharp drop in the foreign take starting in 1954. As indicated in Table 1, Canada is the largest customer of U. S. petroleum. Last year

Canada used 76 percent of U. S. crude exports and 40 percent of all products on which a country-by-country destination is made public.

Canada is approaching self-sufficiency in petroleum productive capacity from the fields of Alberta and Saskatchewan, and by the end of 1953 will be producing a much greater percentage of its petroleum requirements, with the completion of a pipe line to the West Coast and completion of the Interprovincial line from the Superior, Wis., lakehead across the U. S. to Sarnia, Ont. While for years to come, Canada will continue some petroleum imports, these may be balanced by the volume of crude exports the nation will send to the U. S. West Coast through the Trans Mountain line.

Other U. S. export customers, the United Kingdom and Mexico, are increasing their domestic refining capacities and will in future years require less U. S. refined products. While lubricating oils have always been a major U. S. export petroleum product, construction of lube plants, principally in Western Europe, contributed to a decline of 1,400,000 barrels in U. S. exports of lubricants last year from 1951. The total exported, 16,046,000 barrels, however, was higher than for previous postwar years except 1951.

Regardless of what the nation's tariff laws will be after June 12, the controversial question of whether imports are supplementing or supplanting U. S. domestic crude oil production will remain unsettled for some time. Arguments supporting a high volume of imports basically are the same as those used to bolster the position that domestic production should supply U. S. markets to the greatest extent possible.

Importing companies, which for the most part have made substantial investments abroad, argue they were urged by the U. S. government, in the interest of national security, to develop petroleum resources around the world. They also contend that they have to have an income from the production of oil in these nations to make the development of reserves possible. This is the same (and properly so) defense of domestic producers, large and small. A profitable production is needed to generate funds to drill wells to discover more oil for domestic reserves, also needed for national security.

In reality, the big point that requires consideration is just what volume of imports is needed to insure American (and friendly nations') companies control over oil resources around the world in the event of a showdown with Communist Russia and its satellites. The important national security aspect of overseas oil resources was admitted recently by one of the strongest supporters of an import policy that would see foreign oil only supplement U. S. production.

A revision of tariff rates, either upward or downward, would have little effect on import rates. Anticipated increased imports for 1953 are approximately in line with the general year-to-year increases that have been experienced in the postwar years, though tariffs on petroleum this year are lower than those prevailing prior to the reduction last fall. Present tariff rates, resulting from the revised trade agreement with Venezuela, tax imported fuel oil and crude oil of 25 gravity and above at a flat rate of 10½ cents a barrel and lower the duty of crude of less than 25 gravity to 5¼ cents per barrel. Crude oil, topped crude, and fuel oils account for nearly all of the U. S. petroleum imports.

The recent adoption by the American Petroleum Institute's executive committee of the 1949 National Petroleum Council policy that imported oil should supplement and not supplant domestic output gives weight to the concern growing in the industry over the import problem. The problem is highlighted by the fact that while total demand for U. S. petroleum (domestic plus exports) has grown 45 percent in the postwar period, from 1946 through 1952, imports have jumped 150 percent. In the last four years, throughput of domestic crude oil to U. S. refineries has increased 12 percent to a total of 2.2 billion barrels last year, but in the same period runs of foreign crude oil to U. S. refineries have increased by 65 percent to 206.5 million barrels in 1952.

Imported crude oil now reaches the U. S. from all major producing areas of the world—South America, Middle East, Far East and Canada—as shown in Table 2. The percentage of crude imports from the eastern hemisphere has increased in recent years from 24 percent of the total in 1948 to nearly 30 percent in 1952. Refined products imports are from the Caribbean area.

TABLE 1
Who Buys U. S. Petroleum Exports?
(U. S. Export Shipments in 1952)
BARRELS DAILY

ITEM	Canada	France	United Kingdom	Mexico	Other Countries	Total Exports
Crude Oil	55,470	1,600	1,900	....	13,490	72,950
Motor Fuel	*	*	*	*	*	100,700
Kerosine	1,730	....	4,260	285	15,480	21,750
Distillate	29,800	....	11,200	956	50,700	92,660
Residual	20,470	....	2,830	6,500	46,500	76,300
Other Oils†	*	*	*	*	*	71,450
TOTAL	.....	....	.....	....	.....	435,810

* Detailed breakdown not available. Such data not released by Commerce Department for Security reasons.

† Other oils are: Lubricants, Wax, Coke, Asphalt, Liquefied Gases and Miscellaneous products.

Source: Bureau of Mines and Commerce Department.

TABLE 2
Who Supplies U. S. Petroleum Imports?
(U. S. Imports of Crude Oil and Refined Products in 1952.)
BARRELS DAILY

COUNTRY or PRODUCT	Volume
Crude Oil:	
Colombia	44,300
Iraq	1,900
Kuwait	72,250
Mexico	23,200
Saudi Arabia	80,300
Venezuela	331,800
Borneo	4,400
Canada	3,000
Sumatra	9,900
Total Crude Oil	571,050
Shipped to East Coast	525,500
Refined Products:	
Motor Fuel	4,400
Residual	351,100
Distillate	7,300
Asphalt	7,910
Other Unfinished Oils	13,700
Total Refined Products	384,410
Shipped to East Coast	370,710
Total, Crude and Products	955,460
Shipped to East Coast	896,210

* Complete breakdown of countries supplying refined products imports is unavailable. Imported products come from Curaçao, Aruba, Trinidad, Mexico and Venezuela.

Source: Bureau of Mines and Commerce Department.

What the Company Reports Show

- **Small organizations drill approximately 74 percent of all wells in U. S.**
- **They are more dominant in wildcatting. accounting for near 80 percent.**
- **About 38 percent of total U. S. production is credited to the smaller operators.**
- **Comparison of '52 and '51 figures reveals ceaseless competition.**

By L. J. LOGAN
WORLD OIL Staff

SMALL COMPANIES, independent operators and drilling contractors, with crude oil production of less than 10,000 barrels per day in most cases, currently drill approximately 74 percent of the wells being completed in the U. S. They are even more dominant in wildcatting. They account for about 80 percent of all exploratory wells being drilled.

Many wildcatters stick closely to searching for new fields, selling properties after proving them up, and going out and looking for still more fields. Nevertheless, about 38 percent of the total crude production in the U. S. is accounted for by some 18,000 or more small companies, partnerships, and individuals, mostly having less than 10,000 barrels per day of production and predominantly having less than 5,000 barrels daily output. These independent operators in 1952 produced about 875 million gross barrels of crude, or nearly 2.4 million barrels daily, which was 38

Domestic Refinery Runs and Crude Oil Production of U. S. Companies in 1952

(Data from all available annual reports of U. S. companies with refinery runs and/or crude production above 10,000 barrels daily.)

COMPANY and RANK	CRUDE RUNS TO STILLS			CRUDE OIL PRODUCTION	
	Total Barrels	Barrels Daily	Percent of U.S.	Barrels Daily	As Percent of Runs to Stills
(1-A) Standard (N.J.) U.S. Affiliates, Total	285,114,000	779,000	11.68	405,612	52.1
1. Standard (N.J.) Net Share of U.S. Affiliates	259,330,398	708,553	10.62	307,724	43.4
72 Percent of Humble O. & R. Co.	66,300,480	181,149	2.72	251,713	139.0
Wholly Owned Subsidiaries	193,029,864	527,404	7.90	56,011	10.6
Esso Standard Oil Co	185,583,960	507,060	7.60	.....	.....
Carter Oil Co.	7,446,000	20,344	0.30	56,011	275.3
2. The Texas Co.	192,197,466	525,129	7.87	301,926	57.5
3. Socony-Vacuum Oil Co.	185,702,000	507,382	7.61	218,656	43.1
4. Standard Oil Co. (Indiana)	185,342,400	506,400	7.59	245,200	48.4
5. Gulf Oil Corp.	182,118,000	497,590	7.46	223,574	44.9
6. Standard Oil Co. of Calif.	149,394,855	408,183	6.12	279,574	68.5
7. Shell Oil Co.	139,632,000	381,508	5.72	262,566	68.8
8. Sinclair Oil Corp.	138,987,146	379,746	5.69	116,885	30.8
9. Humble Oil & Refining Co.	92,084,000	251,596	3.77	349,601	139.0
10. Cities Service Co.	86,735,000	236,981	3.56	106,363	44.9
11. Phillips Petroleum Co.	79,880,986	218,254	3.27	123,731	56.7
12. Sun Oil Co.	78,013,865	213,153	3.19	106,003	49.7
13. Atlantic Refining Co.	64,796,000	177,039	2.66	92,423	52.2
14. Tide Water Associated Oil Co.	54,946,681	150,127	2.25	95,589	63.7
15. Union Oil Co. of Calif.	49,840,000	136,175	2.04	91,989	67.6
16. Standard Oil Co. (Ohio)	43,360,540	118,471	1.78	33,916	28.6
17. Richfield Oil Corp.	38,383,000	104,872	1.57	57,817	55.1
18. Pure Oil Co.	37,364,041	102,088	1.53	72,402	70.9
19. Continental Oil Co.	34,897,000	95,347	1.43	113,442	119.0
20. Mid-Continent Petroleum Corp.	21,301,193	58,200	0.87	18,908	32.5
21. Skelly Oil Co.	15,810,850	43,199	0.65	64,949	150.3
22. Sunray Oil Corp.	14,506,969	39,637	0.59	70,126	176.9
23. The Ohio Oil Co.	13,774,297	37,635	0.57	92,508	245.8
24.*Plymouth Oil Co.	13,708,273	37,454	0.56	20,722	55.3
25. Lion Oil Co.	7,931,703	21,671	0.32	19,163	88.4
26. Deep Rock Oil Corp.	5,650,000	15,437	0.23	8,209	53.2
27. South Penn Oil Co.	3,319,986	9,071	0.14	12,053	132.9
† Total 27 Companies	2,122,708,115	5,799,749	86.95	3,254,306	56.1
Remainder of Industry	318,550,885	870,358	13.05	3,007,981	345.6
Total, United States	2,441,259,000	6,670,107	100.00	6,262,287	93.9

* Through wholly owned subsidiary, Republic Oil Refining Co., which has plant at Texas City, Texas.

† Includes 100 percent of Humble as one company and Standard (N.J.) wholly owned subsidiaries, Esso Standard and Carter, as one company.

Net Earnings of U. S. Oil Companies

COMPANY	1952	1951	Percent Diff.
Amerada	$ 15,896,361	$ 16,296,652	— 2.5
Amer. Republics	5,240,672	4,753,689	+10.2
Atlantic	40,426,955	45,067,298	—10.3
Cities Service	49,258,591	57,177,581	—13.9
Continental	38,087,890	41,292,692	— 7.8
Deep Rock	904,164	2,241,385	—59.7
Gulf Oil	141,820,328	140,070,932	+ 1.2
Houston Oil	6,344,057	7,053,640	—10.1
Humble	145,292,144	169,480,626	—14.3
Lion Oil	10,211,425	11,751,026	—13.1
Mid-Continent	15,590,497	17,062,182	— 8.6
Ohio Oil	39,354,021	41,681,663	— 5.6
Phillips	75,284,261	73,711,229	+ 2.1
Plymouth	9,648,095	10,295,792	— 6.3
Pure Oil	27,304,373	33,593,727	—18.7
Richfield	25,624,998	28,218,281	— 9.2
Shell Oil	90,872,834	97,020,194	— 6.3
Sinclair	86,475,303	81,898,490	+ 5.6
Skelly Oil	28,032,692	31,074,985	— 9.8
Socony-Vacuum	171,091,587	161,622,159	+ 5.9
South Penn	7,206,628	7,347,655	— 1.9
Standard, Calif.	174,030,499	173,341,211	+ 0.4
Standard, Ind.	119,981,438	148,697,356	—19.3
Standard, N.J.	519,981,109	528,460,779	— 1.6
Standard, Ohio	17,697,083	23,164,581	—23.6
Sun Oil	43,013,063	45,353,643	— 5.2
Sunray	24,724,411	24,282,516	+ 1.8
Texas Co.	181,242,172	178,774,677	+ 1.4
Texas Gulf Prodcg.	3,185,498	3,152,765	+ 1.0
Tex. Pac. Coal, Oil	6,846,335	6,824,124	+ 0.3
Tide Water	31,116,521	37,060,606	—16.0
Union, Calif.	27,579,759	27,295,971	+ 1.0
United Gas	18,291,434	18,312,946	— 0.1
*Total, 32 Cos.	2,052,365,054	2,123,952,427	— 3.4

* Excludes Humble; includes Standard, N.J., which owns 72 percent of Humble.

percent of the U. S. total of 6,262,287 daily.

Modern refining is relatively unattractive to concerns of limited capital, as it requires heavy investment on long term basis even for plant facilities alone, while still more capital is needed for desirable adjuncts such as crude production, products pipe lines and marketing facilities. Companies with refinery runs of less than 10,000 barrels per day account for only about 13 percent of total crude runs to stills at U. S. refineries. This is only a little more than the throughput of the one company that ranks first among U. S. refiners.

However, this 13 percent of the nation's refining in the hands of independents can be potent competitively. It is about 870,000 barrels a day of plant throughput, scattered over the country, a large enough volume to exert strong influence in the market. Furthermore, even keener competition prevails among the 27 or so larger refiners having crude runs of 10,000 barrels daily or more, each always trying and frequently succeeding in boosting business volumes above those of competitors.

The above facts, showing the importance of independent operators in drilling and production and the existence of keen competition among refiners, are among the most significant revealed through study of the lately released annual reports of oil companies for 1952.

The ceaseless competition is revealed even more noticeably by comparing results for 1952 with those for 1951, as reported in WORLD OIL of May, 1952, Pages 50 to 61. In all

Domestic Crude Oil Production of U. S. Companies in 1952 and Wells and Acreage Held at End of Year

(Data from all available annual reports of U. S. companies with crude production and/or refinery runs above 10,000 barrels daily.)

COMPANY and RANK	Net Domestic Crude Oil Production (Company's Net Share: Does Not Include Royalty and Co-Owner Interests)			Wells, Producing, End of Year (Net Wells Owned in U.S. Except As Indicated)			Acres of Leases and Fee Lands, Held, End of Year (Net Acres in U.S. except as Indicated)		
	Total Barrels	Barrels Daily	As Percent of U.S.	Oil	Gas	Total	Producing (Developed or Operated)	Non-Producing (Undeveloped or Prospective)	Total Acreage
All Companies and Persons	**2,291,997,000**	**6,262,287**	**100.00**	**488,882**	.....	.....	.....	.....	.....
(1-A) Standard (N.J.) U.S. Affiliates, Total	148,454,000	405,612	6.47	.....	.....	15,001	.....	.....	.....
1. Humble Oil & Refining Co.	127,953,568	349,600	5.58	.....	.....	[15]11,333	.....	14,852,000	[7]14,852,000
(1-B) Standard (N.J.) Net Share of U.S. Affiliates	112,626,880	307,724	4.92	.....	.....	11,828	.....	.....	.....
(a) 72 percent of Humble	92,126,880	251,713	4.02	.....	.....	8,160	.....	.....	.....
(b) 100 percent of Carter Oil Co.	20,500,000	56,011	0.89	3,668	.....	3,668	.....	.....	.....
2. The Texas Co.	[1]110,505,068	301,926	4.82	.....	.....	.....	.....	[16]12,029,351	[7]12,029,351
3. Standard Oil Co. of Calif.	102,324,013	279,574	4.47	.....	.....	7,023	.....	.....	.....
4. Shell Oil Co.	96,099,000	262,566	4.20	.....	.....	.....	.....	.....	.....
5. Standard Oil Co. (Ind.)	89,743,200	245,200	3.91	9,194	1,307	10,501	1,160,000	14,560,000	15,720,000
6. Gulf Oil Corp.	81,828,084	223,574	3.57	13,700	.....	13,700	.....	[7]13,722,000	[7, 17]13,722,000
7. Socony-Vacuum Oil Co.	80,028,096	218,656	3.49	.....	.....	.....	.....	11,700,000	[17]11,700,000
Magnolia Petroleum Co.	61,608,048	168,328	2.69	.....	.....	.....	.....	.....	.....
General Petroleum Corp.	18,420,048	50,328	0.80	.....	.....	.....	.....	.....	.....
8. Phillips Petroleum Co.	45,285,506	123,731	1.98	.....	.....	[8]12,533	[13]957,321	[13]10,462,008	[13]11,419,329
9. Sinclair Oil Corp.	42,779,910	116,885	1.86	.....	.....	.....	313,968	11,454,174	11,768,142
10. Continental Oil Co.	41,519,772	113,442	1.81	.....	.....	.....	299,141	8,841,420	9,140,561
11. Cities Service Co.	[2]38,929,000	106,363	1.70	.....	.....	.....	.....	.....	9,061,000
12. Sun Oil Co.	38,796,941	106,003	1.70	.....	.....	.....	.....	.....	.....
13. Tide Water Associated Oil Co.	34,985,604	95,589	1.53	.....	.....	5,677	175,178	1,690,982	1,866,160
14. Ohio Oil Co.	33,858,027	92,508	1.48	[10]7,143	[10]171	[10]7,314	.....	.....	3,202,105
15. Atlantic Refining Co.	[3]33,827,000	92,423	1.47	3,294	45	3,339	.....	.....	3,987,000
16. Union Oil Co. of Calif.	[6]33,668,000	91,989	1.47	.....	.....	.....	.....	.....	.....
17. Pure Oil Co.	26,499,067	72,402	1.16	.....	.....	.....	.....	.....	.....
18. Sunray Oil Corp.	25,666,137	70,126	1.12	.....	.....	3,346	186,517	1,857,353	2,043,870
19. Amerada Petroleum Corp.	25,406,673	69,417	1.11	2,228	166	2,394	.....	.....	[14]6,127,000
20. Skelly Oil Co.	23,771,499	64,949	1.04	3,318	428	3,746	340,881	3,650,041	3,990,922
21. Richfield Oil Corp.	21,161,000	57,817	0.92	1,109	9	1,118	12,713	272,564	285,277
22. Carter Oil Co.	20,500,000	56,011	0.89	3,668	.....	3,668	.....	.....	.....
23. Standard Oil Co. (Ohio)	[4]12,413,153	33,916	0.54	.....	.....	2,417	119,177	1,284,843	1,404,020
24. Plymouth Oil Co.	7,584,318	20,722	0.33	.....	.....	736	.....	657,692	[17]657,692
25. Lion Oil Co.	7,013,577	19,163	0.30	.....	.....	818	35,745	1,540,174	1,575,919
26. Mid-Continent Petroleum Corp.	6,920,176	18,908	0.30	.....	.....	[9]2,211	[9]104,456	[9]1,503,179	[9]1,607,635
27. Texas Pacific Coal & Oil Co.	6,849,324	18,714	0.30	.....	.....	.....	104,049	812,613	916,662
28. United Gas Corp.	6,169,112	16,855	0.27	[12]457	[12]630	[12]1,087	.....	.....	[12]2,307,035
29. American Republics Corp.	[5]5,199,396	14,206	0.23	.....	.....	[5]1,131	36,173	925,740	.....
30. Houston Oil Co. of Texas	[5]5,053,646	13,808	0.22	.....	.....	.....	.....	.....	.....
31. South Penn Oil Co.	4,411,398	12,053	0.19	13,676	471	14,147	429,360	308,384	737,744
32. Deep Rock Oil Corp.	3,004,500	8,209	0.13	.....	.....	[18]438	36,000	819,000	855,000
Total, 32 Companies	1,239,753,765	3,387,305	54.09	.....	.....	[19]108,677	[20]4,310,679	[21]12,943,518	[22]140,976,424
Royalty and Co-Owner Oil Produced, Estimated	177,107,681	483,901	7.73	.....	.....	.....	.....	.....	.....
Gross Production, Above Companies, Estimate	1,416,861,446	3,871,206	61.82	.....	.....	.....	.....	.....	.....
Remainder of Industry	875,135,554	2,391,081	38.18	.....	.....	.....	.....	.....	.....
Total United States	2,291,997,000	6,262,287	100.00	488,882	.....	.....	.....	.....	.....

[1]Includes condensate. [2]Includes royalties received. [3]Includes LPG. [4]Includes other liquid hydrocarbons. [5]Gross wells. [6]Includes some in Canada. [7]Not indicated if net or gross. [8]Gross wells; includes few in Canada and Venezuela. [9]Royalty or working interest. [10]Wells operated. In addition, Ohio had interest in other wells operated by others as follows: 5,121 oil, 32 gas, 5,153 total. [11]Owned in fee, leased, or covered by gas purchased contracts. [12]Wholly owned wells. In addition, United Gas partially owned other wells as follows: 180 oil, 482 gas, 662 total. [13]Gross acreage in U.S. [14]Full or part interest in leases, mineral rights, royalties. [15]Wells operated by company. [16]Includes productive acreage. [17]Undeveloped acreage only and not indicated if net or gross. [18]Full interest wells; in addition, Deep Rock had part interest in 1,280 wells operated by Deep Rock and 1,112 wells operated by others. [19]Total for 21 companies and subject to footnotes in this column. [20]Total for 15 companies and subject to footnotes in this column. [21]Total for 20 companies and subject to footnotes in this column. [22]Total for 24 companies and subject to footnotes in this column.

Texaco Takes Over Drilling Lead, Humble Is Still the No. 1 Producer

phases of operations, drilling, producing, and refining, numerous companies ranked differently in 1952 from their standing in the industry in 1951.

In drilling, especially, individual companies showed substantial changes in rank, based on the number of wells drilled. The Texas Company had the distinction in 1952 of drilling more wells than any other company, and Humble Oil & Refining Company drilled the second largest number. In 1951 Humble was first and The Texas Company second. Other leaders in drilling in 1952 included Standard Oil Company (Indiana) third, Standard Oil Company of California fourth, Socony-Vacuum Oil Company fifth, Shell Oil Company sixth.

Humble held onto its rank as No. 1 domestic producer, however, with net crude production of 349,600 barrels daily, equivalent to 5.58 percent of U. S. output. The Texas Company was 1952's second largest domestic producer, as in 1951, having had an output of 301,926 barrels daily average. Standard Oil Company of California remained third largest producer. But Shell Oil Company went into fourth place from fifth, trading positions with Standard Oil Company (Indiana). Gulf Oil Corporation remained sixth.

In refining, Standard Oil Company

Number of Wells Completed in 1952 by U. S. Companies (Part 1)

(Data from all available annual reports of U. S. companies with crude production and/or refinery runs of 10,000 barrels daily.)

COMPANY and RANK	[1]SUMMARY OF WELLS DRILLED IN U.S. IN 1952		DETAILS OF ALL WELLS DRILLED IN 1952					
				PRODUCTIVE				
	Gross Wells	Net Wells	Class of Wells and Basis Reported	Oil	Gas (& Cond.)	Total Prod.	Dry	Total Drilled
(A-1) Standard (N.J.) U.S. Affiliates, Total	....	1,304	Net wells drilled, Total	....	....	916	388	1,304
			Exploratory	....	....	69	182	251
			Development	....	....	847	206	1,053
1. The Texas Co	1,411	1,187[2]	Gross wells drilled	....	....	....	....	1,411
			Drilled by Texas Co., Total	....	....	....	....	1,187
			Exploratory	....	....	64	216	280
			Development	....	....	....	....	907
			Part-interest wells drilled by others	....	....	....	....	224
2. Humble Oil & Refining Co	1,235	1,102[2]	Gross wells drilled	....	....	....	....	1,235
			Drilled by Humble, Total	....	....	808	294	1,102
			Exploratory	....	....	56	139	195
			Wildcats	....	....	30	98	128
			New Pay Tests	....	....	26	41	67
			Development	....	....	752	155	907
			Part-interest wells drilled by others	....	....	....	....	133
(2-A) Standard (N.J.) Net Share of U.S. Affiliates	....	995	Net wells drilled, Total	....	....	689	306	995
			Exploratory	....	....	53	143	196
			Development	....	....	636	163	799
3. Standard Oil Co. (Indiana)	950	706	Gross wells drilled	538	207	745	205	950
			Exploratory	26	30	56	108	164
			Development	512	177	689	97	786
			Net wells drilled	399	158	557	149	706
4. Standard Oil Co. of Calif.	....	689	Net wells, U.S., Canada, Venezuela	504	12	516	173	689
			Exploratory	....	....	44	126	170
			Development	....	....	472	47	519
5. Socony-Vacuum Oil Co.	849[3]	....	U. S. wells, basis not shown	....	....	723	126	849
			Exploratory	....	....	13	47	60
			Development	....	....	710	79	789
6. Shell Oil Co	846[3]	....	Total (incl. Canada), basis not shown	....	....	708	136	846
			Exploratory	....	....	36	77	113
			Development	....	....	672	61	733
7. Phillips Petroleum Co.	769	....	Gross wells drilled	599	70	669	100	769
			Exploratory	21	5	26	36	62
			Development	578	65	643	64	707
8. Sinclair Oil Corp.	....	568	Net wells in U.S.	446	20	466	102	568
			Exploratory	12	4	16	50	66
			Development	434	16	450	52	502
9. Gulf Oil Corp.	626	....	Gross wells, U.S. and foreign	....	....	....	....	1,034
			Gross wells in U.S.	....	....	448	178	626
			Exploratory, gross	....	....	30	....	....
			Drilled by Gulf	....	....	25	....	....
			Drilled by others	....	....	5	....	....
			Development, gross	....	....	418	....	....
			Gross wells, foreign	....	....	....	....	408
			Venezuela, Exploratory	18	3	21	10	31
			Kuwait, gross	....	....	8	....	8
			Canada, Exploratory	3	2	5	....	....
10. Sun Oil Co.	614	....	Gross wells drilled	333	59	392	222	614
11. South Penn Oil Co.	....	507	Net Wells, Total	....	....	....	....	507
			Exploratory	3	2	5	6	11
			Development	....	....	....	....	496
			Oil and gas	237	8	245	....	245
			Intake	....	....	....	....	251
12. Cities Service Co.	....	499	Net wells, (incl. few in Canada)	239	154	393	106	499
			Exploratory, gross	15	4	19	67	86
			Development, approximate	224	150	374	39	413
13. The Ohio Oil Co.	572	....	Gross wells, Total	....	....	....	....	572
			Oil, gas, dry	297	15	312	87	399
			Exploratory	12	5	17	57	734
			Development	309	10	295	30	325
			Input wells	....	....	....	....	173
14. Continental Oil Co.	562	374	Gross wells	....	....	....	....	562
			Net wells, Total	225	32	257	117	374
			Exploratory	18	9	27	83	110
			Development	207	23	230	34	264
15. Skelly Oil Co.	....	301	Net wells completed	205	37	242	59	301

[1] Gross wells are all wells in which company held whole or part interest; net wells include wholly owned wells and only company's share in part interest wells
[2] Wells drilled by company; does not include part interest wells drilled by others. [3] Not shown if gross or net.

Standard Oil (N. J.) Keeps Top Refining Spot, The Texas Company Second

(New Jersey) easily retained No. 1 rating. But The Texas Company moved into second place from fourth, causing Socony-Vacuum Oil Company and Standard Oil Company (Indiana) to drop down one position each and into third and fourth place, respectively. Gulf Oil Corporation remained fifth largest in volume of refinery runs.

The petroleum industry as a whole earned a little less net profit in 1952 than in 1951, in spite of doing somewhat larger volumes of business. For 32 companies, aggregate net earnings in 1952 were 3.4 percent less than in 1951. (See table.) Eleven of the 32 companies showed small increases, mostly less than 5 percent. The other 21 companies showed decreases in earnings, mostly 10 percent or less. Factors holding down earnings included the slowing down of demand for petroleum products, the refinery strikes of mid-1952, weakness of prices of some products in some areas and high taxes.

Number of Wells Completed in 1952 by U. S. Companies (Part 2)

(Data from all available annual reports of U. S. companies with crude production and/or refinery runs of 10,000 barrels daily.)

COMPANY and RANK	[1]SUMMARY OF WELLS DRILLED IN U.S. IN 1952		DETAILS OF ALL WELLS DRILLED IN 1952					
				PRODUCTIVE				
	Gross Wells	Net Wells	Class of Wells and Basis Reported	Oil	Gas (& Cond.)	Total Prod.	Dry	Total Drilled
16. Atlantic Refining Co.	....	225	Net wells, U.S. and foreign	157	28	185	77	262
			Net wells in U.S.	....	....	....	....	225
			Exploratory	....	....	8	36	44
			Development	....	....	....	....	181
17. Sunray Oil Corp.	328	224	Gross wells	....	....	234	94	328
			Net wells	....	....	171	53	224
18. Union Oil Co. of Calif.	319[3]	....	Total, basis not shown	....	....	221	98	319
			Exploratory	....	....	10	....	....
19. Amerada Petroleum Corp.	305	....	Gross wells	217	13	230	75	305
20. Tide Water Associated Oil Co.	....	208	Net wells	....	....	192	16	208
21. Carter Oil Co.	....	202	Total wells drilled	....	....	108	94	202
			Exploratory	....	....	13	43	56
			Development	....	....	95	51	146
22. Standard Oil Co. (Ohio)	218	151	Gross wells, total	146	9	155	63	218
			Exploratory	8	2	10	33	43
			Development	138	7	145	30	175
			Net wells, total	112	3	115	36	151
			Exploratory	5	....	5	22	27
			Development	107	3	110	14	124
23. Mid-Continent Petroleum Corp.	215	....	Gross wells, total	....	....	....	....	215
			Exploratory	....	....	9	24	33
			Development	....	....	....	....	182
			Full interest wells	....	....	....	....	144
			Primary	93	3	96	38	134
			Secondary	....	....	....	....	10
			Partnership	....	....	....	....	71
			Oil, gas, dry	20	17	37	28	65
			Service	....	....	....	....	6
24. Deep Rock Oil Corp.	208	....	Gross wells, total	....	....	....	....	208
			Primary wells	....	....	63	79	142
			Exploratory	....	....	18	67	85
			Development	....	....	45	12	57
			Waterflood wells	....	....	66	....	66
25. Texas Pacific Coal & Oil Co.	124	99	Total wells, gross	67	16	83	41	124
			Net wells	....	....	....	....	99
26. Lion Oil Co.	125	90	Gross wells, total	59	13	72	53	125
			Exploratory	....	....	8	40	48
			Development	....	....	64	13	77
			Net wells	39	7	46	44	90
27. American Republics Corp.	124	84	Gross wells	82	14	96	28	124
			Wildcats	5	3	8	17	25
			Development	77	11	88	11	99
28. Plymouth Oil Co.	98	84	Gross wells	....	....	86	12	98
			Net wells	....	....	72	12	84
29. Richfield Oil Corp.	....	75	Net wells	....	....	39	36	75
30. United Gas Corp. (Union Producing Co.)	77	....	Gross wells drilled	24	29	53	24	77
			Exploratory	....	4	4	9	13
			Development	24	25	49	15	64
			Drilled by Co. for self and others	21	25	46	20	66
			Part interest wells drilled by others	3	4	7	4	11
31. Houston Oil Co., of Texas	105	....	Gross wells	53	17	70	35	105
			Exploratory	2	4	6	20	26
			Development	51	13	64	15	79
			Net wells	....	....	....	....	58
Total 31 Companies	....	....	Net wells, total	....	....	....	....	11,779[4]
			(Percent of U.S.)	....	....	....	....	25.7
Rest of Industry			New wells, total	....	....	....	....	34,106
			(Percent of U.S.)	....	....	....	....	74.3
Total, United States	....	45,885	New wells, total	23,290	3,514	26,804	17,759	45,885[6]
Total 31 Companies	....	....	Exploratory wells	....	....	....	....	2,246[5]
			(Percent of U.S.)	....	....	....	....	20.3
Rest of Industry	....	....	Exploratory wells	....	....	....	....	8,820
			(Percent of U.S.)	....	....	....	....	79.7
Total, United States	....	11,066	Exploratory wells	1,571	399	1,970	9,096	11,066

[4] For 12 companies that apparently reported only gross wells, net wells are here estimated as 80 percent of gross; this ratio being indicated by reports showing both gross and net wells. [5] For 10 companies that reported only total wells, exploratory wells are here estimated as 17.3 percent of total; this ratio being indicated by reports showing both total and exploratory wells. [6] Includes 1,322 injection and disposal wells.

The Changing Panorama

Is the FPC Ready for a Change of Heart Toward Business?

Men of the petroleum and natural gas industries have been given some assurance that future policies of the Federal Power Commission may be sympathetic to business. Such assurance was offered by Nelson Lee Smith, FPC member, in an address in Houston April 7 before the Petroleum Industry Electrical Association.

He stated that though the commission had wavered on the issue, it had never attempted to fix the price on any arm's length sale of natural gas by a producer to an interstate pipe line. He said the commission's course was set by Congress when it passed the Natural Gas Act, which says that "The provisions of this act . . . shall not apply . . . to the production or gathering of natural gas." The commission accordingly ruled in August, 1951, that it did not have jurisdiction over Phillips Petroleum Company as a "natural gas company" under the Act. "The ultimate effect of this case, which is now on appeal," added Smith, "will only be determined by the final decision of the courts."

Smith cautioned that the gas industry should keep prices reasonable, nevertheless, in the interest of itself as well as the consumers. He added that the commission actually has considerable authority to prevent exorbitant prices. When it is passing upon certificates authorizing pipe line facilities, it can take into account the reasonableness of the prices at which the applicant proposes to purchase gas in the field. "Furthermore," he declared, "the commission and the consumers are always free to seek amendatory legislation by Congress. Thus, if the present laws appear to be lacking in adequate protection for the consuming public, the producers may receive an unpleasant reminder that they are greatly outnumbered by the consumers."

Another matter on which the natural gas industry got some encouragement from Smith was that of prices of gas produced by pipe line companies. Smith restated his view that "natural gas produced by interstate pipe line companies should not be priced differently in rate making from the gas which is purchased from independent producers."

"I see little logic," he said, "in discriminating between the gas which an interstate pipe line system purchases and that which it produces. While this does, to be sure, grant an apparent advantage to consumers in the form of somewhat lower rates, in the long run it provides a reason for pipe line companies to seek devices whereby they can further the immediate interests of their stockholders by separating their production properties from the operation of their interstate pipe line systems.

"I think this is pointed up," Smith continued, "by the fact that prior to 1938 and the passage of the Natural Gas Act, most of the major pipe line companies were also important producers of natural gas. As recently as 1940, eight major interstate pipe lines produced more than 47 percent of the gas which they transported and sold, as compared with only 18.5 percent of their total requirements produced by 15 major pipe lines in 1951. It is hard to believe that this is due purely to coincidence and completely unrelated to the rate making policies of the Federal Power Commission. Yet it is generally recognized that the ownership of some production is advantageous to pipe lines, both in bargaining for purchased gas and in terms of flexibility and economy of operation—and hence is in the ultimate interest of their customers."

Synthetics Production Left to Industry

Some indication of a more cooperative government-industry relationship under the Eisenhower Administration than had existed in previous years can be seen in the change of policy on synthetic fuels.

Henceforth the role of the Bureau of Mines in this field will be research and not uneconomical pilot plant operation. This was decreed in the recent decision of Secretary of Interior Douglas McKay to close the synthetic pilot gasoline plant at Louisiana, Mo. Secretary McKay stated the Bureau of Mines would continue its research work on synthetic fuels and that he would encourage private industry to take over operation of the closed down facilities.

Such a move represents a complete victory for the National Petroleum Council which had opposed strongly the plans of the previous secretary of interior to jump into large scale production of synthetic gasoline from coal hydrogenation. This is the policy that NPC's synthetic fuels committee recommended to the previous administration on several occasions. Secretary McKay's announcement noted that ". . . the cost of operating the plant (at Louisiana, Mo.) does not justify its continuance . . ." This backs up the argument of the industry committee which cited its own studies to show that the process in use by the Bureau of Mines was uneconomical and contested the statement of the former Interior Department head that synthetic gasoline could be produced at competitive prices to the natural product.

Safety Shows

Tangible evidence that safety programs of the oil industry are paying off is offered by results of last year when the industry's safety record was the best in its history. The annual survey of industry-wide accident statistics by the American Petroleum Institute showed that the frequency rate of injuries in the industry declined to 9.67 per one million man-hours worked. This was the first time this index has ever dropped below 10 and compared with a frequency of 10.50 in 1951 and 10.08 in 1950, the previous all time low.

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Report from the Observatory

Economic Picture Brightens

By **RAY L. DUDLEY,** Publisher, and **WARREN L. BAKER,** Editor

THE INDUSTRY has an excellent opportunity to improve its economic position during the next few months. The threat of excessive supplies has been partially overcome, and can be more fully corrected during the next several months. To achieve this desired goal, it will be necessary to hold U. S. crude production to an average of about 6⅓ million barrels daily and refinery runs to around 6¾ million barrels per day during May and June.

This producing level would be less than during the first three months of the year, when production averaged approximately 6½ million barrels daily. Refinery runs of 6¾ million barrels per day would compare with an average of slightly over 7 million barrels daily during the first quarter of 1953.

The benefits from a program of this nature would be enhanced greatly if importation rates also are reduced from their present high level, as promised by several of the large importing companies.

• • •

SOME OF THE NEED for reducing producing and refining operations during coming months springs from last year's refinery strike, which closed a substantial portion of the nation's plants. Nearly 50 million barrels were drawn from refined product stocks during the strike. Abnormally high operations were required during the last half of 1952 to make up these losses.

No strike seems likely this year. Hence, the industry cannot expect to be called upon to duplicate the high refining levels which were necessary in the last half of 1952. With uninterrupted operations anticipated, more normal operating levels will suffice this year.

At the same time, during the coming four or five months, the industry must forego its usual practice of judging current conditions by comparing present stock levels with those of a year ago. The heavy inventory reductions during the 1952 strike will soon cause inventories to look more excessive than they actually will be. It will be necessary to remember that stocks in 1952 were abnormally low. Otherwise, comparison of 1953 inventories with 1952 would lead to false conclusions. It will be October or November before comparisons with year ago levels again will have their usual significance.

• • •

CONSIDERABLE IMPROVEMENT in the industry's inventory position has occurred during March and April. Stocks are in much better position than a few months ago. Consequently, there is more optimism that excessive stocks can be avoided through careful limitation of production and refining rates.

Biggest improvement has taken place in gasoline stocks, which are no longer too large. Greater than anticipated motor fuel consumption has taken place lately. Spring-like weather during late March and early April resulted in extensive motoring and farm activity.

As a result of higher-than-expected demand, gasoline inventories in mid-April were only 3½ million barrels higher than a year ago, although they had been 6 million barrels greater just one month previously. Stocks in the territory east of California were less than a million barrels above year ago levels on April 11.

Distillate fuel stocks, still feeling the effects of one of the warmest winters in recent years, were 12½ million barrels above 1952 levels in mid-April. This means the industry will have to guard against creating too large inventories of heating oil between now and next November.

However, continued strong demand for gasoline would enable refiners to maintain reasonable crude run volumes, and still avoid excessive distillate stock accumulations through adjustment of yields to produce larger amounts of gasoline and smaller quantities of fuel oil.

The over-all outlook indicates the industry has an excellent opportunity to bring about a better balance in its economic position, providing it holds its producing, importing and refining volumes down during the next two or three months.

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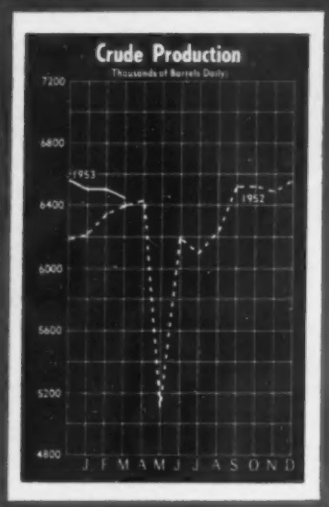
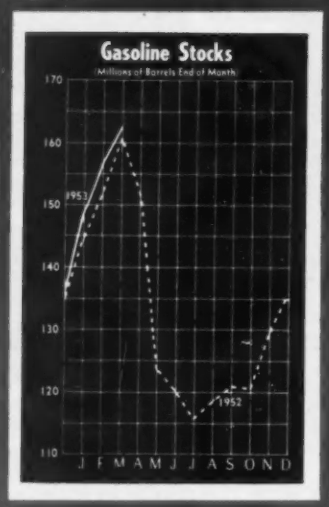
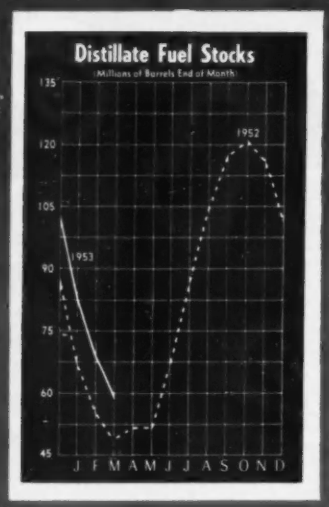
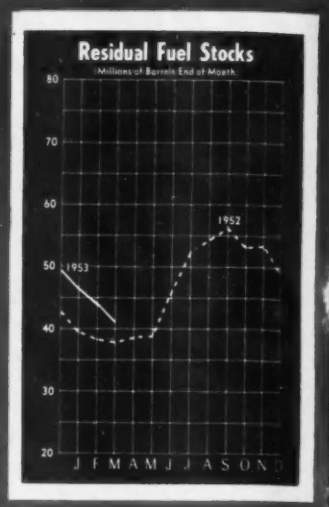


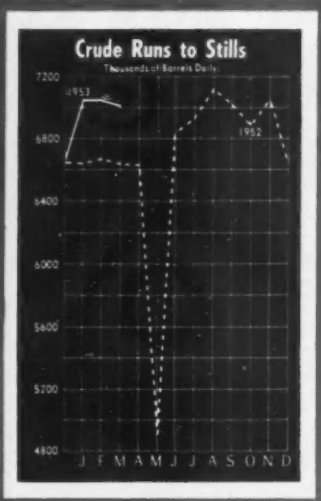


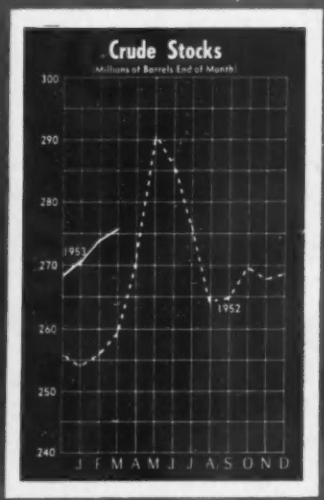




Petroleum Trends in the U. S.

By **CECIL W. SMITH,** WORLD OIL Staff

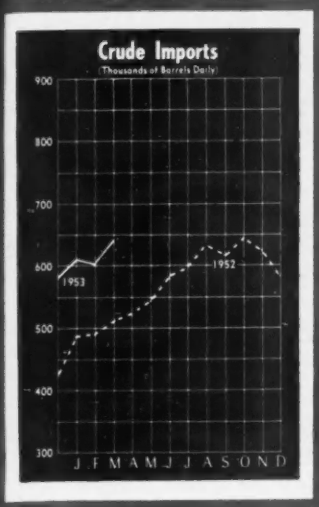


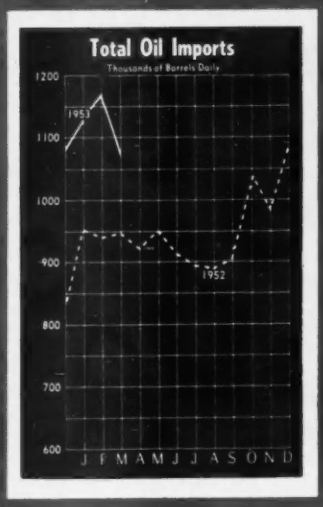


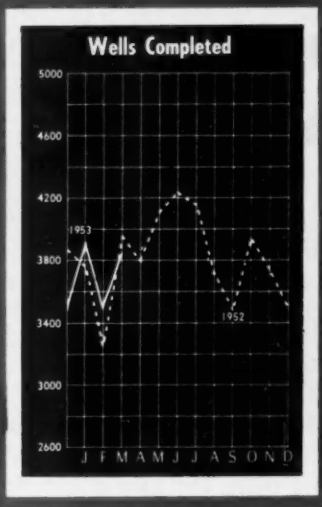
U. S. Crude Production by States

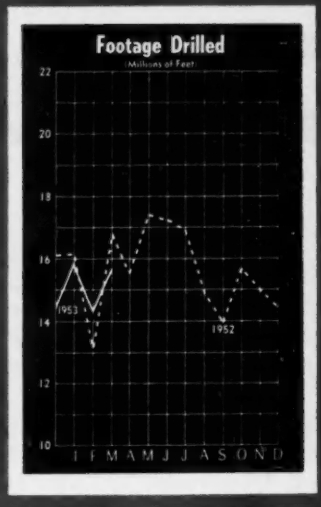
(THOUSANDS OF BARRELS)

STATE or DISTRICT	DAILY AVERAGE PRODUCTION				TOTAL PRODUCTION First Three Months		
	March, 1953	February, 1953	March, 1952	% Diff. March, '52-'53	1953	1952	% Diff. '52-'53
Alabama	4.4	4.2	2.5	+ 76.0	367	238	+ 54.2
Arkansas	78.0	78.3	81.6	— 4.4	6,995	7,365	— 5.0
California	988.9	987.4	976.9	+ 1.2	89,035	88,712	+ 0.4
Colorado	89.9	87.7	79.2	+ 13.5	7,942	7,129	+ 11.4
Florida	1.5	1.5	1.7	— 11.8	137	154	— 11.0
Illinois	165.6	166.1	152.3	+ 8.7	14,880	14,221	+ 4.6
Indiana	34.1	34.0	29.9	+ 14.0	3,052	2,751	+ 10.9
Kansas	333.2	337.8	323.5	+ 3.0	30,015	29,686	+ 1.1
Kentucky	29.6	29.8	34.6	— 14.5	2,684	3,208	— 16.3
Louisiana	711.4	700.9	653.8	+ 8.8	63,156	59,041	+ 7.0
North Louisiana	116.2	115.0	120.5	— 3.6	10,350	10,841	— 4.5
South Louisiana	595.2	585.9	533.3	+ 11.6	52,806	48,200	+ 9.6
Michigan	33.8	35.1	36.3	— 6.9	3,126	3,379	— 7.5
Mississippi	97.0	96.5	98.8	— 1.8	8,687	9,061	— 4.1
Missouri	0.1	0.1	0.1	.....	3	7	— 57.2
Montana	31.1	30.1	23.3	+ 33.5	2,770	2,215	+ 25.1
Nebraska	12.6	12.8	5.6	+125.0	1,116	505	+121.0
New Mexico	178.7	176.1	167.2	+ 6.9	15,926	14,699	+ 8.3
New York	12.8	13.0	11.2	+ 14.3	1,167	1,052	+ 10.9
North Dakota	15.0	14.6	0.6	.....	1,330	29	.....
Ohio	9.4	8.7	8.3	+ 13.3	820	769	+ 6.6
Oklahoma	542.7	535.1	537.0	+ 1.1	48,235	48,697	— 1.0
Pennsylvania	28.5	28.3	30.6	— 6.9	2,544	2,755	— 7.7
Tennessee	0.1	.....	.....	.....	3	3	.....
Texas	2,833.1	2,938.8	2,938.7	— 3.6	260,788	261,650	— 0.3
Dist. 1—South Central	36.9	36.8	33.6	+ 9.8	3,332	3,008	+ 10.8
Dist. 2—Middle Gulf	157.6	167.4	170.1	— 7.4	14,749	15,150	— 2.7
Dist. 3—Upper Gulf	483.0	497.3	499.3	— 3.3	44,385	44,683	— 0.7
Dist. 4—Lower Gulf-S.W.	259.7	266.9	272.5	— 4.7	23,707	23,955	— 1.0
Dist. 5—East Central	48.9	52.3	62.6	— 21.9	4,619	5,377	— 14.1
Dist. 6—Northeast	375.7	391.6	396.5	— 5.3	34,811	36,041	— 3.4
Dist. 7-B—North Central	104.9	111.4	88.6	+ 18.4	9,351	7,918	+ 24.4
Dist. 7-C—West Central	178.8	178.6	145.8	+ 22.6	15,992	12,664	+ 26.3
Dist. 8—West	927.6	972.1	1,038.5	— 10.7	85,572	90,461	— 5.4
Dist. 9—North	187.3	188.4	161.6	+ 15.9	16,911	14,604	+ 15.8
Dist. 10—Panhandle	72.7	76.0	82.2	— 11.6	6,859	7,550	— 9.2
Utah	5.2	5.2	4.5	+ 15.6	466	387	+ 20.4
Virginia	0.1	0.1	.....	.....	9	3	+200.0
West Virginia	7.0	7.3	6.9	+ 1.4	643	667	— 3.6
Wyoming	209.6	202.8	182.9	+ 14.6	18,663	17,011	+ 9.7
Total United States	6,453.4	6,532.3	6,388.0	+ 1.0	584,559	575,394	+ 1.6









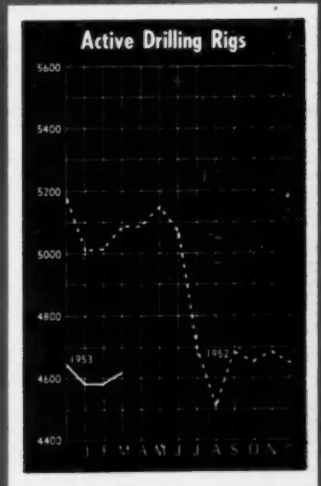
- **Crude output lowered**
- **Refining rates eased**
- **Motor fuel at new peak**
- **Crude stocks moving up**

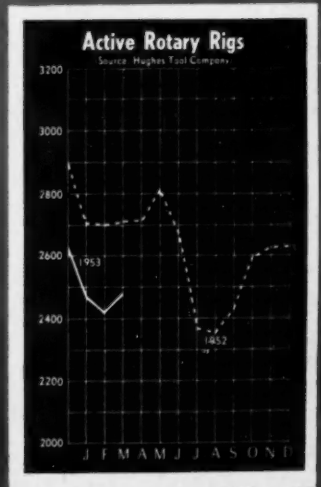
Crude Oil and Refined Products Trends

(THOUSANDS OF BARRELS)

MONTH	CRUDE OIL			GASOLINE		DISTILLATE FUEL		RESIDUAL FUEL		DAILY IMPORTS	
	Production Daily	Runs to Stills Daily	Stocks End of Month	Production Daily	Stocks End of Month	Production Daily	Stocks End of Month	Production Daily	Stocks End of Month	Crude Oil	Total Oils
1951:											
February	5,930	6,562	235,247	2,906	145,184	1,419	51,348	1,382	40,716	468	937
March	6,052	6,469	233,824	2,908	149,679	1,327	46,744	1,348	38,366	483	861
April	6,127	6,183	243,180	2,821	147,679	1,171	48,239	1,230	37,623	511	871
May	6,170	6,436	248,418	3,031	141,658	1,210	59,272	1,265	39,879	518	876
June	6,130	6,575	248,170	3,100	137,000	1,254	72,140	1,277	42,398	563	876
July	6,141	6,462	250,847	3,091	130,931	1,228	84,282	1,275	46,320	546	788
August	6,232	6,539	254,276	3,114	124,202	1,237	94,028	1,226	48,365	529	780
September	6,261	6,558	254,900	3,127	124,530	1,282	104,082	1,228	49,608	500	744
October	6,375	6,446	262,266	3,105	118,864	1,295	109,544	1,224	49,573	421	769
November	6,272	6,609	261,100	3,130	122,723	1,358	101,666	1,304	46,491	425	802
December	6,182	6,646	255,783	3,150	134,867	1,442	86,619	1,313	42,853	423	834
1952:											
January	6,217	6,640	254,007	3,094	144,339	1,456	66,969	1,338	39,523	488	951
February	6,367	6,673	255,900	3,109	151,912	1,528	55,369	1,322	38,295	491	940
March	6,388	6,640	259,126	3,069	160,689	1,400	48,750	1,274	37,971	510	947
April	6,429	6,435	270,679	2,995	151,890	1,312	51,634	1,253	38,561	539	922
May	5,107	4,905	290,813	2,295	123,656	982	51,648	979	38,821	545	951
June	6,197	6,825	285,964	3,169	120,166	1,455	65,911	1,228	45,688	581	911
July	6,093	6,927	275,951	3,295	116,566	1,475	85,775	1,237	52,245	597	892
August	6,219	7,118	264,368	3,377	118,592	1,514	104,257	1,252	54,061	632	879
September	6,518	7,017	264,723	3,428	120,991	1,502	117,252	1,230	56,200	615	932
October	6,518	6,883	269,776	3,301	120,062	1,458	120,721	1,203	53,052	643	1,037
November	6,487	7,049	267,852	3,416	129,509	1,510	116,096	1,299	53,069	624	984
December	6,634	6,952	271,928	3,361	136,028	1,509	99,582	1,302	48,706	603	1,165
1953:											
January	6,555	7,042	272,250	3,384	150,518	1,528	80,655	1,307	45,910	616	1,135
February	6,533	7,055	274,123	3,371	157,612	1,515	68,025	1,272	44,432	565	1,004
March	6,453	7,024	275,409	3,284	162,609	1,475	59,743	1,285	40,572	637	1,074
Mar., 1953 Change:											
In Month	—80	—31	+1,286	—87	+4,997	—40	—8,282	+13	—3,860	+72	+70
In Year	+65	+415	+16,283	+215	+1,920	+75	+10,993	+11	+2,601	+127	+127
Week Ended:											
4-11-53	6,268	6,705	274,964	3,215	161,207	1,399	60,972	1,246	40,663	466	909
4-12-52	6,366	6,315	260,698	3,077	157,781	1,345	48,494	1,249	35,880	503	791

Source: Data for last two months from API; prior monthly data from Bureau of Mines.





Completions Up, But Drilling Falling Behind 1952 Pace

ALTHOUGH WELLS completed in the first three months of this year led those of last year's same period by 2.5 percent, drilling activity is currently not keeping pace with last year's rate.

Since the beginning of the year there have been from 400 to 500 fewer drilling rigs being used by the industry. Unless some of those stacked rigs are brought off the yards soon, leadership in wells drilled will most likely change hands before the middle of the year.

Beginning with this issue, WORLD OIL presents monthly drilling figures for Western Canada. These will be found at the bottom of the accompanying table, and currently show that Canadian activity this year, unlike the U. S., has been well out in front of last year's.

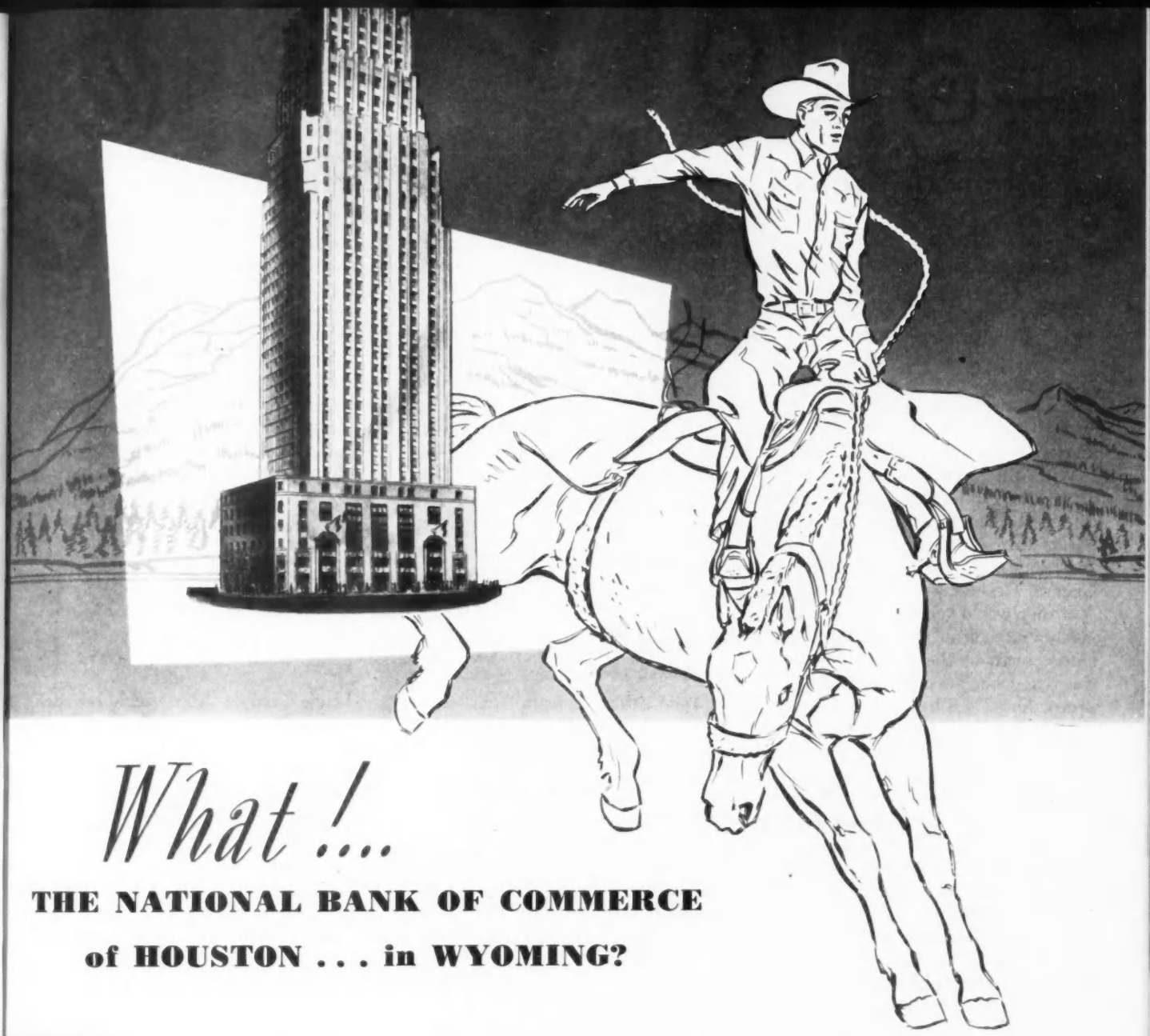
In the U. S., wells completed in March totaled 3913, to show a gain of 391 wells from shorter February's, but they fell short of last March's by 97 wells. Compared with last year, March wells were 3.3 percent fewer, while footage drilled declined 6.1 percent. That means that each new well completed in March was 122 feet shallower, on the average, than last year's counterpart.

During the year's first quarter, 11,378 wells were recorded as completed in the U. S. That amounted to a gain of 2.5 percent over the 11,096 drilled in the same period of 1952. The amount of footage drilled in those wells showed something else. A total of 45,960,498 feet was represented in this year's wells, and that amounted to 0.3 percent less than was drilled a year ago. So far, each new well drilled averaged 4069 feet deep, while a year before the new well average had been 4191.

The difference in average depth between the two periods' wells, explain in part how fewer drilling rigs have been able to drill more wells this year than a greater number did last year. This is a fair example of how the amount of footage penetrated is a better yard stick with which to measure drilling activity than only the number of wells.

Wells Completed in the U. S. and Western Canada During March and the First Three Months, 1953

State or District	MONTHLY COMPLETIONS, MARCH, 1953									TOTAL COMPLETIONS				CUMULATIVE TOTALS January-March					Rigs in Operation (Drilling, Rigging, Up and Shut Down		
	NEW WELLS								Total Drilled Deeper												
	Oil	Dist.	Gas	Dry	Water Input	Gas Input	Water Disposal	Total New		Mar., 1953	Feb., 1953	Mar., 1952	Footage March, 1953	Wells 1953	Wells 1952	Percent Diff.	Footage 1953	Footage 1952	Mar., 31, 1953	Feb. 28, 1953	Mar. 31, 1952
Alabama	1			5				6		6	10	4	36,351	25	11	+127.3	134,247	58,386	6	6	7
Arizona											1			3			4,927		4	4	3
Arkansas	20			19			1	40		40	29	31	138,829	115	87	+ 32.2	412,788	322,583	26	30	38
California	174		2	48				224	9	233	190	233	938,997	658	649	+ 1.4	2,717,906	2,608,939	272	245	253
Colorado	8		4	26				38		38	40	34	196,155	125	98	+ 27.6	604,946	552,433	32	31	39
Florida				4				4		4	4		23,062	9	1	+800.0	48,255	11,794	2	4	1
Georgia				1				1		1			4,682	1			4,682		3	3	
Idaho				1				1		1			12,720	1			12,720		1	1	1
Illinois	53			49				102		102	142	135	272,224	446	343	+ 30.0	1,145,796	831,261	153	137	152
Indiana	38		1	50				89		89	72	74	165,614	300	267	+ 12.4	546,920	472,527	132	125	145
Kansas	216		46	199			3	464		464	328	319	1,587,797	1,153	976	+ 18.1	3,989,899	3,409,764	491	493	442
Kentucky	34		15	38				87		87	71	81	171,499	229	238	— 3.8	442,063	484,843	91	85	91
Louisiana	97	3	16	61				177		177	187	190	1,352,590	598	548	+ 9.1	4,169,516	3,741,191	240	228	230
North Louisiana	32		5	25				62		62	81	89	214,376	258	292	— 11.7	931,628	1,130,247	50	46	62
South Louisiana	65	3	11	36				115		115	106	101	1,138,214	340	256	+ 32.8	3,237,888	2,610,944	190	182	168
Maryland				1				1		1		2	4,177	1	10	— 90.0	4,177	39,668	4	5	23
Michigan	14		1	29				44		44	32	63	120,239	135	146	— 7.5	351,969	387,517	80	82	101
Mississippi	6	1		14				21		21	25	33	154,899	85	104	— 18.3	624,205	739,415	27	24	25
Missouri											1	3		2	6	— 66.7	2,186	8,523		2	6
Montana	10			11				21		21	40	13	127,020	91	38	+139.5	438,205	109,829	49	56	51
Nebraska	11			8				19		19	14	18	100,083	63	47	+ 34.0	330,852	239,612	21	16	12
Nevada											1			1			810		3	2	1
New Mexico	46		43	19				108	1	109	105	95	565,551	365	256	+ 42.6	2,028,175	1,349,285	188	174	204
New York	42				27			69		69	75	87	96,357	216	196	+ 10.2	300,902	274,724	98	102	85
North Carolina																					
North Dakota	17			6				23		23	23	5	188,401	60	6	+900.0	476,902	49,902	28	23	15
Ohio	29		10	31				70		70	68	93	148,752	218	213	+ 2.3	468,518	471,785	157	167	147
Oklahoma	407	1	21	225	2			656	23	679	529	446	2,432,423	1,719	1,417	+ 21.3	6,192,523	5,157,109	571	617	610
Oregon																					
Pennsylvania	47		14	3	48	4		116	2	118	138	160	212,592	366	379	— 3.4	636,928	658,513	243	249	214
South Dakota				2				2		2			7,905	2			7,905		2	2	2
Tennessee																				2	6
Texas	725	16	57	569		1		1,368	17	1,385	1,292	1,772	6,345,774	4,094	4,753	— 13.9	18,661,293	22,847,672	1,417	1,380	1,880
Dist. 1 S. Central	33			27				60		60	57	57	174,821	188	173	+ 8.7	564,564	540,587	41	40	55
Dist. 2 Middle Gulf	22	4	5	42				73		73	38	77	444,613	181	212	— 14.6	1,090,265	1,348,240	56	53	68
Dist. 3 Upper Gulf	50	10	8	61				129	1	130	124	151	899,702	387	453	— 14.6	2,634,348	2,944,982	125	111	162
Dist. 4 L. Gulf-S.W.	73	2	12	55				142		142	180	162	837,854	487	442	+ 10.2	2,816,647	2,240,587	115	113	118
Dist. 5 E. Central	9		2	13				24		24	23	35	87,022	80	101	— 20.8	320,506	546,153	16	18	27
Dist. 6 Northeast	13		7	23				43		43	38	44	257,877	128	140	— 8.6	749,736	899,917	44	37	42
Dist. 7-B N. Cent	123		3	115				241	1	242	222	266	859,885	731	692	+ 5.6	2,388,869	2,260,318	132	137	187
Dist. 7-C W. Cent	66		1	39		1		107	2	109	116	242	545,861	356	606	— 41.3	1,756,925	3,586,147	153	180	291
Dist. 8 West	145			40				185	12	197	168	363	1,008,450	574	967	— 40.7	3,117,197	5,491,963	335	300	503
Dist. 9 North	166		2	152				320	1	321	296	272	1,099,434	860	789	+ 9.0	2,867,687	2,417,703	322	321	301
Dist. 10 Panhandle	25		17	2				44		44	30	103	139,255	122	178	— 31.5	354,549	571,075	78	70	126
Utah	3		1	7				11		11	8	8	77,657	24	17	+ 41.2	151,989	98,746	16	24	23
Virginia																					
Washington																					
West Virginia	6		30	10				46		46	53	51	118,597	133	143	— 7.0	362,160	406,773	181	196	195
Wyoming	43		2	8				53		53	44	60	268,714	140	147	— 4.8	686,133	748,715	73	70	90
Total U. S.	2,047	21	263	1,444	77	5	4	3,861	52	3,913	3,522	4,010	15,869,661	11,378	11,096	+ 2.5	45,960,498	46,081,509	4,611	4,585	5,092
Western Canada	82		20	52				154		154	194	159	633,729	550	375	+ 46.7	2,263,869	1,620,393	161	167	173



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News Analysis

Government Drops Criminal Charges in Oil Cartel Suit

The five American and two British oil companies and their subsidiaries will have the opportunity of defending themselves against the broad "international oil cartel" charges of the Federal Trade Commission without the stigma of being branded as "criminals" as a result of the civil suit filed by the Justice Department in Washington District Court in late April.

With the filing of the new complaint, the criminal suit against these companies which grew out of a directive of former President Truman last June has been abandoned. Attorney General Herbert Brownell stated that "existing world tensions require that, in the interest of national security, enforcement of the anti-trust laws in this case be pursued through civil proceedings." The government's charges in the civil suit, similar to the previous criminal suit, are general in nature and alleged the companies through agreements dating back to 1928 participated in market-sharing and price-fixing arrangements in violation of the U. S. antitrust laws.

The companies cited in the FTC "cartel" report are Gulf Oil Corporation, Socony-Vacuum Oil Company, Inc., Standard Oil Company of California, Standard Oil Company (New Jersey), The Texas Company and the two British companies, Anglo-Iranian Oil Company, Ltd., and Royal Dutch-Shell Company. Named also were foreign-operating subsidiaries of these companies, some of which are owned jointly by one or more of the seven firms. Federal Judge James R. Kirkland, who presided when the criminal suit was before the grand jury, forced the Justice Department to drop the criminal charges against Anglo-Iranian on grounds that the firm was owned 52 percent by the British government and could not be indicted.

Should an indictment and subsequent conviction have been obtained under the abandoned criminal suit, fines and prison sentences for officers of the companies involved could have been imposed. Under the civil suit the government can seek orders dissolving corporate ties and prohibiting practices held in violation of antitrust laws. Many of the practices the government charges exist among the defendants in the "cartel" suit are not illegal actions in many countries where some companies charged in the suit operate. All of the so-called "cartel" actions, the Justice Department charges, transpired outside the U. S.

Still unsettled by the filing of the civil suit is the issue of delivery in court of detailed documents relating to international operations of these companies dating back to 1928. The oil companies stated during the hearing of the criminal case before the grand jury that production of such documents would put them in jeopardy of retaliatory action by foreign governments. The British and Dutch governments previously refused to permit papers subpoenaed in the case to leave their countries. Under the criminal action the companies had until April 28 to deliver papers located in this country and until June 16 for documents located abroad.

Prices React to Potential Surpluses

Crude prices in world markets are showing weakness. Responsible are potential surpluses, especially in the Middle East. In that area, more demand for crude is urgently needed. Both British and American interests are actively trying to sell more crude. The Iranian government is seeking desperately to market crude from its nationalized industry at only half the market price in world markets and has actually sold some crude to an Italian company that marketed it in Italy.

Effective April 1, Anglo-Iranian Oil Company posted a new export price of $1.50 per barrel for Kuwait crude of 31-31.9 gravity, f.o.b. Mena el Ahmadi, on the Persian Gulf. That new posting represented a cut of 15 cents per barrel from prices of other similar Middle East crudes. These oils for the past several years have ranged from $1.65 per barrel for 31-31.9 gravity up to $1.75 for 36-36.9 gravity. Anglo-Iranian said at the same time that its export prices for Iraq crude oils (36-36.9 gravity) were $1.75 f.o.b. Fao, Iraq, on the Persian Gulf, and $2.29 f.o.b. Tripoli, Lebanon, or Banias, Syria, on the Eastern Mediterranean. These are the same as the current Iraq crude export prices of other principal sellers.

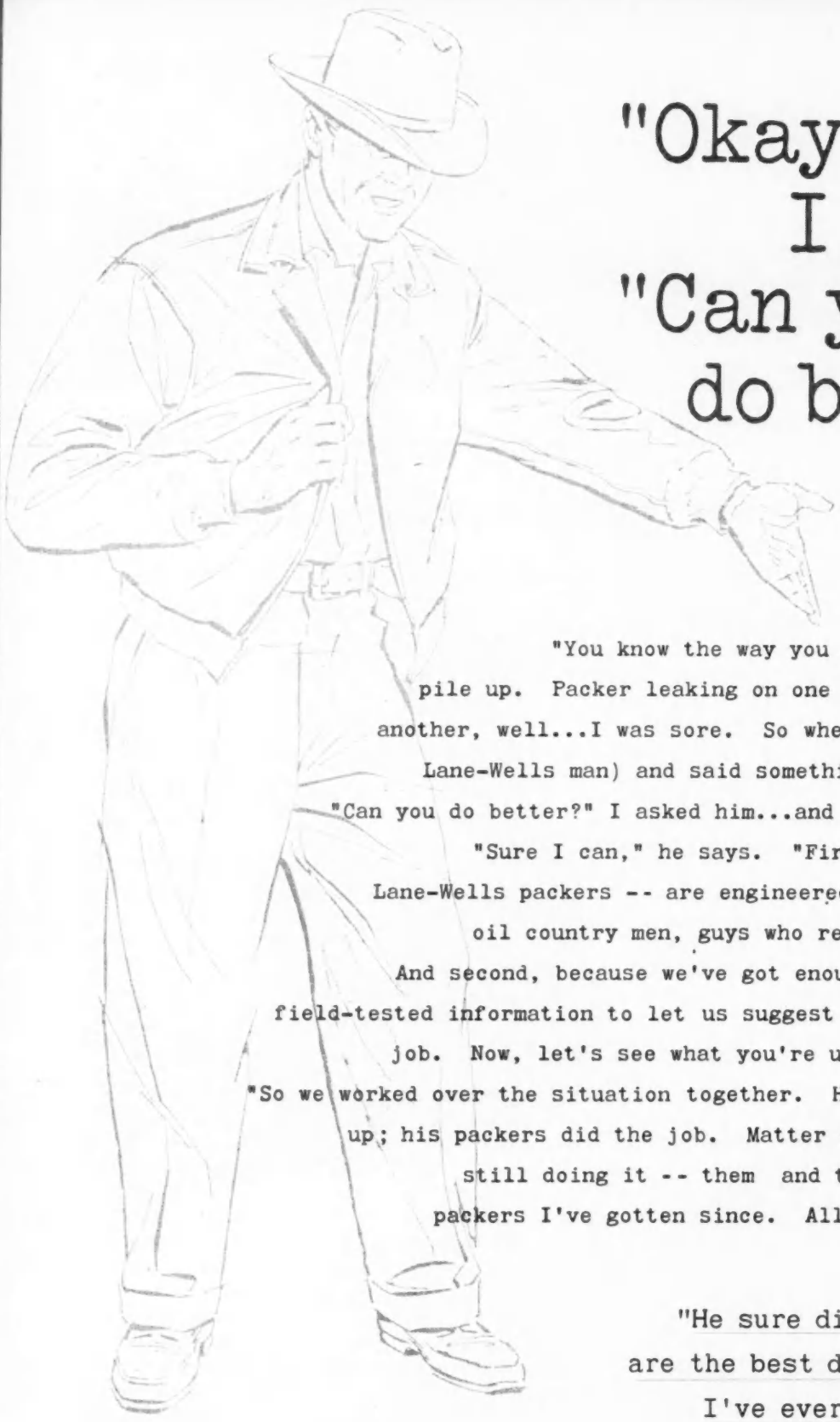
Recent developments appear to make more likely the movement of substantial volumes of Iranian crude oil into world markets.

Iran's Premier Mossadegh has declared to National Front deputies that his country could obtain more money from sale of only 5 million tons of oil annually than Anglo Iranian Oil Company would have paid her in royalties.

Before that address, an additional 16,000 tons of oil destined for Italy moved out from Abadan in the Italian tankers Alba and Miriella, following an Italian court decision permitting the marketing of a cargo of Iranian oil previously brought in to Venice by the Miriella.

Iran has offered to sell oil to the Italian Supor Company for six months at half the corresponding price in the world markets, in appreciation of the company's successful legal fight with Anglo-Iranian Oil Company over the right to purchase nationalized Iranian oil. An Iranian government spokesman expressed hope that this cut-rate offer would also attract other customers.

Anglo-Iranian immediately filed new claims to the oil shipped from Iran to Italy by going to courts in Rome. Under Italian law, it could not appeal its case that it lost in a Venice court, unsuccessfully trying to claim and get possession of the 5000 tons of Iranian oil brought to Italy by the tanker Miriella and sealed in storage at Venice pending court action.



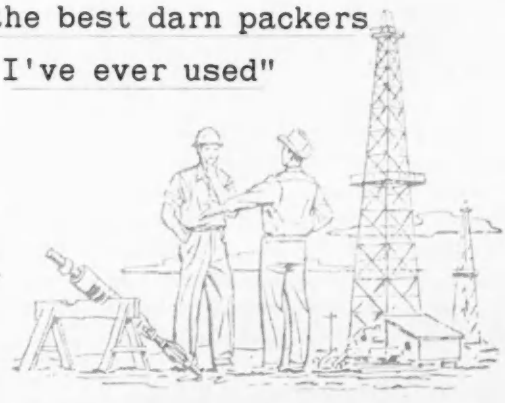
"Okay, Joe," I said, "Can you do better?"

"You know the way you get when troubles pile up. Packer leaking on one job, stuck packer in another, well...I was sore. So when Joe came in (Joe's the Lane-Wells man) and said something, I let him have it. "Can you do better?" I asked him...and he came right back.

"Sure I can," he says. "First, because my packers -- Lane-Wells packers -- are engineered to do their jobs by oil country men, guys who really know what it takes. And second, because we've got enough honest-to-gosh field-tested information to let us suggest the right packer for the job. Now, let's see what you're up against!"

"So we worked over the situation together. His recommendations added up; his packers did the job. Matter of fact, they're still doing it -- them and the other Lane-Wells packers I've gotten since. All I can say is --

"He sure did...these are the best darn packers I've ever used"



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Growing Supply of Tanker Tonnage Sending Rates Down

Oversupply of tanker tonnage is depressing tanker rates and sharply lowering the prices at which tankers can be sold.

Following the addition of 1.6 million tons to the world tanker fleet in the latter half of 1952, there is now under construction a record amount of new tonnage.

In New York before the middle of March a T-2 (15,500 tons) affording clean tonnage was chartered for March 28 loading at the Gulf at $2 per ton, down 29 cents from the previously prevailing rate and 30 percent less than the U. S. Maritime Commission rate. That was a new low for clean U. S. flag tonnage for several years. Dirty tonnage had been available for some weeks at rates as low as 50 percent under USMC.

About a dozen U. S. flagships have been offered for sale lately, mostly over 20 years old but including a few around 10 years of age. Several 30-year-old tankers of less than T-2 size recently were offered at $400,000 each, or only one-third the market price a year ago.

One U. S. flag T-2 tanker about 10 years old, built in 1943, was sold in early March of this year for $1,150,000. One year ago a West Coast major company purchased a T-2 tanker for a price of $2,600,000.

The declines in tanker rates and prices of older tankers reflect the economies and relatively lower costs inherent in modern, faster tankers. The new tankers provide savings in operating costs per ton shipped and also in time and wages required for voyages. A modern super tanker of 29,000 tons can be operated at only slightly greater cost than a T-2 carrying 15,500 tons and for not a great deal more than a Liberty ship of 9500 tons. The super tanker has a speed up to 18 knots, the T-2 up to 14.5, and the Liberty about 10. A super tanker can make a Persian Gulf-New York round trip in about 43 days, compared with 63 days for a T-2.

Oil companies and other owners of tank ships should be giving careful consideration to orderly programs of replacement of vessels, since a large proportion of present tonnage was built in a short period during World War II. This is particularly true of the U. S. fleet. This advice was given in the annual analysis of world fleets by Sun Oil Company, giving data as of Oct. 1, 1952.

The record amount of tonnage now under construction would raise world capacity an additional 56.3 percent by 1957 if there were no losses in the meantime, or by 39.5 percent if all vessels over 20 years of age were taken out of service, the report stated.

The world fleet as of last October 1 had increased in carrying capacity by 36.6 percent since September, 1945. It was equivalent to 1,726.8 T-2's last October, as compared with 1,246.5 in September, 1945.

Trans-Mountain May Hit 300,000 BPD

Ultimately, the Trans Mountain crude line from Alberta fields to Vancouver may afford a capacity of 300,000 barrels per day by use of 12 or 14 pumping stations, the owners expect. The 24-inch main line will be 718 miles long. It will cost $92 million. Half that amount had been spent by the end of 1952. Nearly half the line has been laid, and it will be completed in August.

Originally, it was planned to begin operation of the line with two pumping stations moving 75,000 barrels of crude through it per day. Last July a third station was authorized to raise capacity to 120,000 daily. Trans Mountain Oil Pipe Line Company now is studying potential requirements of prospective shippers and considering addition of a fourth pumping station to provide initial capacity of 150,000 barrels daily.

Owners of the Trans Mountain line, directly or through subsidiaries, include Socony-Vacuum Oil Company, Gulf Oil Corporation, Imperial Oil, Ltd. (Standard of New Jersey), Standard Oil Company of California, Shell Oil Company, the Bechtel Corporation, various Alberta producers, and the general public. Union Oil Company of California recently sold its stock in the company, following decision to abandon plans for building a new refinery in the Puget Sound area.

The Trans Mountain line is now being relied upon as a means for relieving the shortage of petroleum on the Pacific Coast. It will supply crude for refineries in the Puget Sound region and make available products that heretofore had to be brought in from California.

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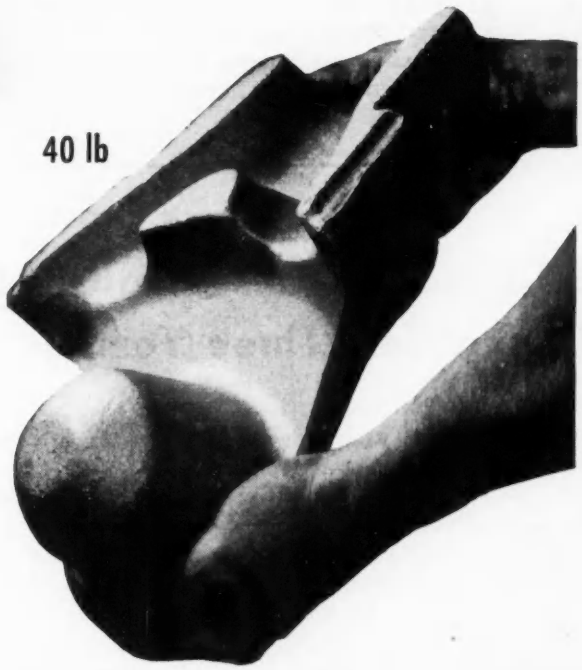

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The Big Moment . . .

for L. F. McCOLLUM

Success in the oil industry comes through hard work, daring, and ingenuity. Sometimes it arrives slowly, sometimes quickly. But however it comes, it is preceded somewhere in the past by a moment of decision when the future is uncertain. Perhaps the fateful moment passes quietly, an almost unnoticed detail in the day's work; or perhaps it is a moment of high suspense. It is The Big Moment. This is the first of a series describing the big moments of men in our industry.

IT WAS A MOMENT of stern decision when L. F. McCollum left a secure niche in the lofty echelons of Standard Oil Company (N. J.) to take command of a company that had once waged a brash feud with the Standard family.

It was a moment of challenge, a disquieting moment perhaps, and certainly a moment of heady triumph.

L. F. McCollum

But it wasn't The Big Moment for the president of Continental Oil Company.

The Big One had passed quietly, remembered only by Mr. Mac himself, on a hungry day in 1920 when the lanky ranch boy registered at The University of Texas.

Back in school at Fordtran and Cuero, Texas, he had discovered in himself a facility for words, a delight in tying them together, head and tail, into crisp sentences.

Leonard wanted to be a journalist, and he told the man so.

"Very well," was the reply, in substance. "But you must take a science course as a prerequisite."

Here was an unwelcome detour to his goal, and the boy's quick mind darted about for a short cut.

"What's the easiest science?"

"Well, you might try geology."

This was it. The Big Moment. "Put me down," said Leonard, wondering what the word meant.

Classes began. Geology intrigued him and journalism was forgotten.

$3 Billion Expansion in Gas Industry During Next Three Years Is Forecast

Growing consumer demand for natural gas assures rapid expansion of pipe line facilities, with the gas industry expected to spend in the neighborhood of $3 billion during the next three years, according to Joseph Bowes, president of the Oklahoma Natural Gas Company, Tulsa. Bowes expressed his views at a recent meeting of the Oklahoma Utilities Association.

During the five-year period 1947 to 1951 the gas industry spent about $5 billion in construction, or at the rate of $1 billion a year. During last year the gas industry spent $1¼ billion.

The gas distributing companies have made very important strides in the last few years due to the availability of natural gas, and securities of natural gas distributing companies are now considered to be comparable to a good electric utility distributing agency, Bowes said.

Bowes stressed the growth and strength of the utilities (electric and gas) industries, and attributed it to improvement in the credit position, the attitude of rate regulatory bodies and the vital part the utilities play in the country's economy.

"Credit ratings of utility companies have been improving steadily," Bowes said. "The distribution companies have maintained generally conservative capitalization ratios in spite of very heavy cash requirements for large construction programs. Pipe line companies have tended toward higher debt but this has been offset to a great extent by heavy sinking funds which retire not only the debt but the preferred stocks over a relatively short period of time."

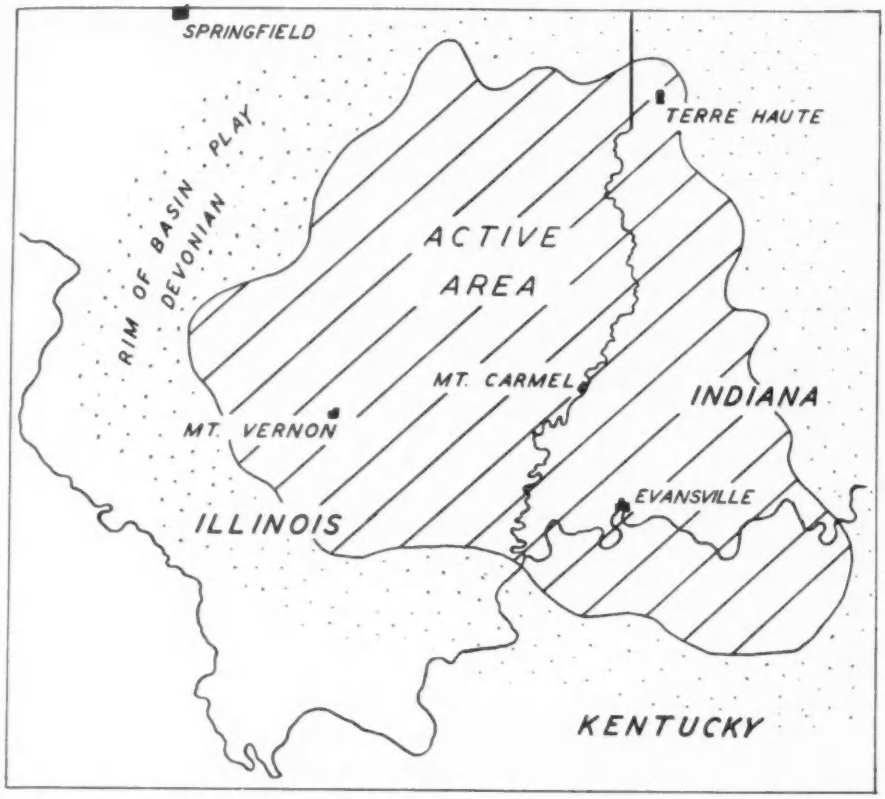
With the trend of cost in every business up so sharply, the utilities definitely merit consideration from regulatory authorities looking towards an increase in rates, Bowes declared. He explained that in his judgment the most important single factor in evaluating the future prospects of any company, electric or gas, is the "regulatory atmosphere."

"Since the market for money is highly competitive, it would seem foolish for an investor to put money in a company which was penalized by a commission demanding a bare minimum rate of return in the face of ever-increasing costs," he said.

New Plant Would Boost Williston

Development of the Williston Basin will be advanced and natural gas will be conserved as a result of projected construction of a natural gasoline plant. It will be built jointly by Amerada Petroleum Corporation and Signal Oil & Gas Company near the Beaver Lodge and Tioga fields, North Dakota. It will process the gas produced along with oil in those areas.

The plant will have capacity to process 40 million cubic feet of gas daily. Construction will be started by June and completed by the Fall of 1954. The plant will be operated by Signal, which will also market the products.



The tri-state area of Illinois-Indiana-Kentucky.

What Are the Opportunities In the Illinois Basin?

- **Fertile field for small independents**
- **Extensive areas of unleased acreage**
- **Rewards are not spectacular**
- **It's 'minor league,' but risks small**

By WILLIAM E. BRUBECK
Consulting Geologist, Mt. Carmel, Ill.

FROM A GEOLOGICAL and operating standpoint the Illinois Basin is not unlike certain portions of North Central Texas, Eastern Oklahoma and Kansas. Yet there are several significant factors which aid and facilitate a program of exploration and development, especially for the newcomer and the independent operator with limited assets.

In the field of exploration most territories present two very expensive factors—seismographing and heavy lease costs— both of which are usually beyond the pocketbook of a young independent operator. Fortunately, a typical exploration deal in the active areas of Illinois requires neither. Seismographing is unnecessary because of the great quantity of subsurface information and because the aspect of structure plays so little a part in new discoveries. The main problem is stratigraphy. A large capital outlay for leases is unneccessary because, for the most part, the acreage lies open—unleased. The landowners habitually reject long-term leases, holding out for short-term drilling deals, often giving the drilling block of acreage free of cost for the consideration of a test well.

Furthermore, the Illinois Basin has many additional advantages for those who don't mind playing ball in the "minor league":

- The geology is relatively simple; the pay zones occur at shallow depths (800 to 3400 feet).
- Subsurface studies can be made rapidly and inexpensively—most wells have electric logs and all information is available.
- Not only are most lease costs low, but desirable areas of play generally are available. Land titles are usually simple, and royalty interests have not been sold widely.
- Drilling costs are cheap ($3.75 to $4 per foot) and production techniques are simple. There is no proration.
- Reliable and efficient operators and associates are usually on hand to underwrite part of the cost of a drilling deal if desired. Supporting dry-hole money can be expected where justified.
- The return on the investment and the effort generally is reasonable.

The geology of the territory is said to be simple because of the uniformity of beds—formations scarcely varying in thickness for 30 miles or more, thus electric logs are rather easy to correlate. Sample studies for subsurface work rarely are necessary, except on the rig floor. There are no unconformities, lap-outs or reefing of consequence in most of the area of activity. The zones of minor faulting are rather well defined.

There are some two to three potentially oil bearing horizons in the average area of play. The oil accumulations appear to result mainly from gentle structural flattenings, accom-

panied by stratigraphic traps. (Figure 1.)

In many areas of normal dip (about 50 feet per mile basinward), various sand lenses have been found productive without any structural flattening whatsoever. Apparently the oil has originated in the shale beds, been squeezed into the reservoir sand lens, and trapped in the porous sand as it wedges out up-dip against impervious shale. There are, in various cases, some fairly prominent anticlinal types structures in the basin. In all instances, however, the oil trap is dependent on the lensing sand (or lime) reservoirs as they grade laterally in and out of shale within a given formation.

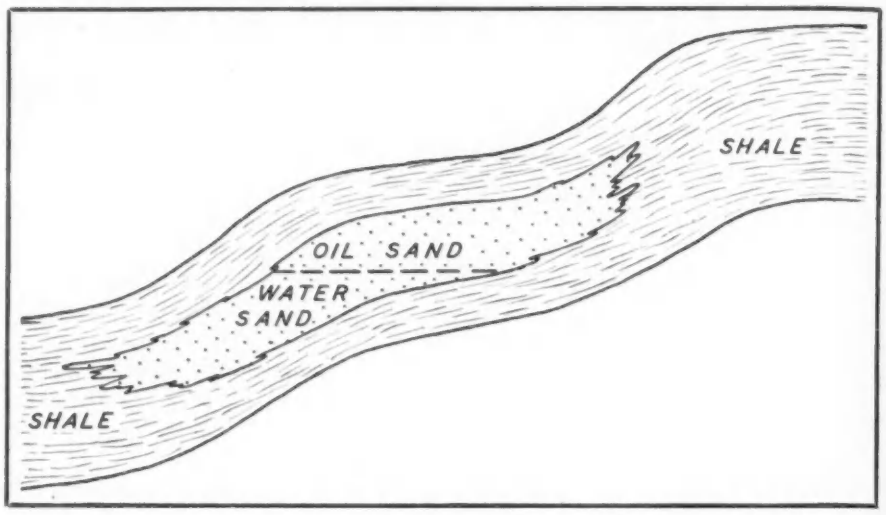


FIGURE 1.

The main geologic approach, then, involves a study of electric logs in an effort to determine the whereabouts of stratigraphic reservoir traps within the various formations—the formations being mainly the Chester Series of the Upper Mississippian. These sand bars may vary from 60 feet to 0 within a drilling location or two, giving exceptionally good production in some cases and terribly disappointing results in others.

Needless to say, a territory characterized by a stratigraphic problem obviously requires reliable and complete subsurface data on all previously drilled wells. In this respect Illinois differs from other older productive areas in that the main drilling campaign came after the invention and general use of the electric log. Thus an electric log and full scout data are available on practically every well drilled since 1937.

The advantage in time and expense can be quickly seen when a subsurface geologist is able to acquire all the tools necessary to contour, isopach, and evaluate a given county in a month's time. One might compare this situation with the problem confronting a newcomer in, say, Runnels County, Texas. There, strip sample logs would have to be borrowed and copied on old wells. Then, to be sure of correlations, well samples would have to be analyzed and plotted on both the older strip logs and the newer electric logs. Microscope work is a slow chore and time is valuable. In the older developed areas there are usually many mystery wells that "should have made oil, BUT" . . . but there are no data to determine how close to play such a mystery hole. In Illinois there is very little of this type of guesswork.

In contrast, the subsurface work in Illinois progresses very rapidly because there is little time wasted on ferreting out obscure information or in pondering geologic complexities. In addition to this, after the subsurface evaluation has been made the odds are favorable that the acreage will be available in some of the desired spots, thus permitting a finished drilling deal to be quickly acquired. In many areas, the very excellent Illinois and Indiana State Geological Surveys at Urbana and Bloomington have complete structural and stratigraphic studies available in their state bulletins. A newcomer would be amazed at the quality and volume of this free state geological information, particularly the wealth of material in the Illinois Survey.

Regarding exploration, an annual record of 50 percent dry-holes—50 percent oil wells is considered fair. The presently found pools are likely to be small, covering 80 acres to 400 acres, depending on areal extent of the erratic sand bars, and in some cases, depending on the appearance of a second pay horizon as the pool develops (See Figure 2), as a lower pay zone permits an east extension to the pool.

Most oil operators today are trying for productive extensions of older pools, usually ½ to 1 mile from existing oil. Much of the acreage lies unleased on the flanks of the known anticlines and terraces, and repeated successes have shown that oil will accumulate as stratigraphic traps any-

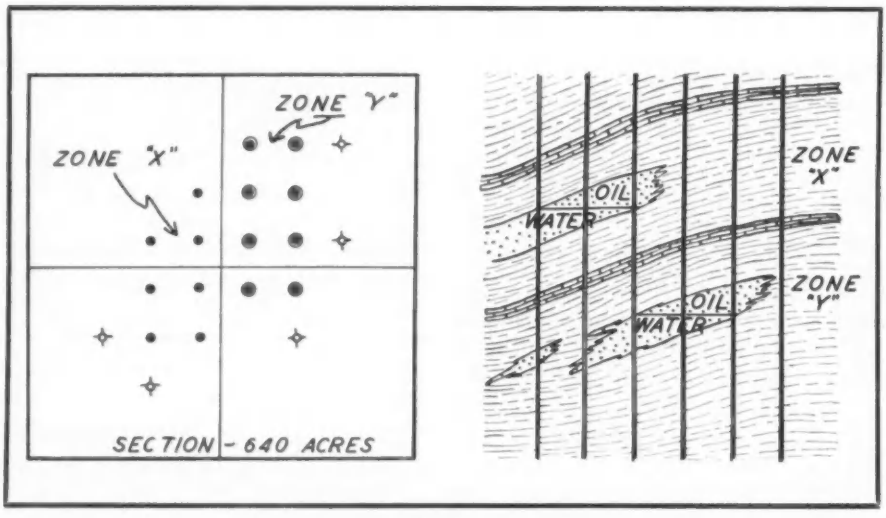
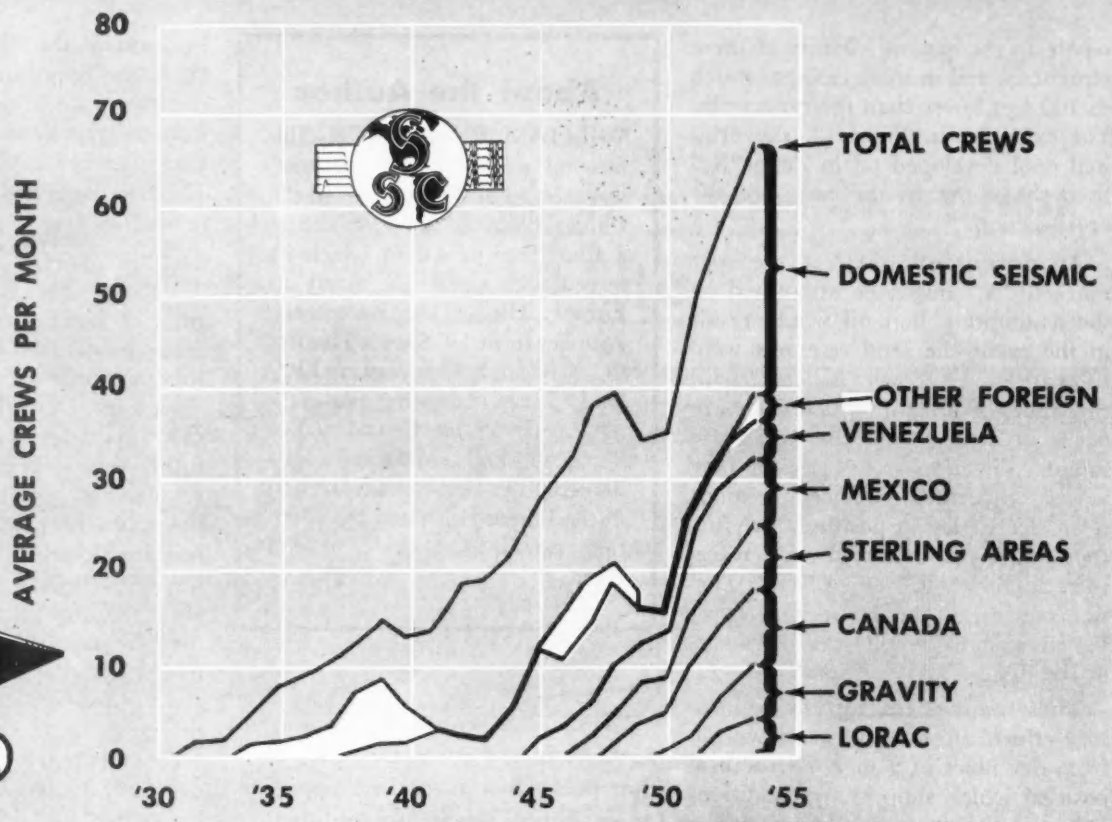


FIGURE 2.
Typical pool and cross-section of pay zones.



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where in the general vicinity of these structures, and in some cases, as much as 100 feet lower than the crest wells. For example, in Figure 3, the original pool developed oil in Zone "X," then shaled-out to the east. See the cross-section.

An extension play at the spot marked "A," might be attempted on the assumption that oil would result in the event the sand reservoir were to reappear in Zone "X," and with the thought that production might occur in Zone "Y" if the sand were found. The above extension play would be further enhanced in merit if an electric log at position "B," further down-dip, indicated sand reservoirs in Zone "X" or "Y," and particularly so, if the scout data mentioned a show of oil in either zone in the dry hole at position "B."

Thus, many of the current exploratory efforts are flank plays, down-dip from dry holes at a higher structural position which show shaly conditions in one or more potentially productive zones for that given area.

About the Author

WILLIAM E. BRUBECK, Illinois oil producer and geologist, has been an active operator in the Illinois Basin since 1939, except a four year period in which he served with the U. S. Army in Europe. His exploration experience began in 1936 with Humble Oil & Refining Company at Midland, Texas, following his graduation from the University of Texas. Brubeck currently divides his attention between exploration in the Illinois Basin and the Montana portion of the Williston Basin.

There is an enormous amount of territory in the currently active area that presents a subsurface approach as explained above. In addition to the sand pinch-outs in the various horizons of the Upper Mississippian, there are opportunities for lime production in the Lower Mississippian in similar type reservoir traps (McClosky zones and Salem horizon). Recently the Salem zone has appeared as a new pay zone in several areas.

Beyond the fringes of the main area of activity, the Illinois Basin offers a wide arc of shallow, exploratory territory where the Lower Mississippian, Devonian, and Trenton may reveal reservoir beds with structural relief. Considerable seismographing is proceeding on the rim of the basin at present. The Devonian horizon already has been found to be highly prolific at various depths from 1600 to 2300 feet. Unfortunately, there is insufficient subsurface information to play this territory, intelligently, and seismographing is rather difficult due to the shallow depth of reflections and because of the sharpness and smallness of the Devonian-Silurian reef-like structures.

Regarding economics, the cost of an oil well in the basin runs about $10 per foot, drilled and equipped. Thus a typical well at 2700 feet costs around $27,000. The productive history of the territory indicates that an oil recovery of some 3000 to 4000 barrels per acre of primary oil (ten acre spacing) can be expected, with possibly ⅔ of this amount of secondary recovery. The over-all cost of drilling and producing the total reserves (requiring about ten years) is in the neighborhood of $1.40 per barrel. Oil in Illinois sells for $2.77 per barrel. From the above, then, one can see that the return on the investment and the effort is not fabulous. The best argument for the 27½% depletion tax allowance is the economic picture of the Illinois play.

Any newcomer to Illinois will find a group of very cooperative and stable independent operators, with headquarters mainly in Evansville, Indiana, Mt. Vernon, Centralia, Mattoon and Mt. Carmel. He also will find a small group of major companies who play the area, despite the difficulty of buying long-term leases. The most active of these companies are Carter, Texas, Gulf, Sinclair, Phillips and Cities Service.

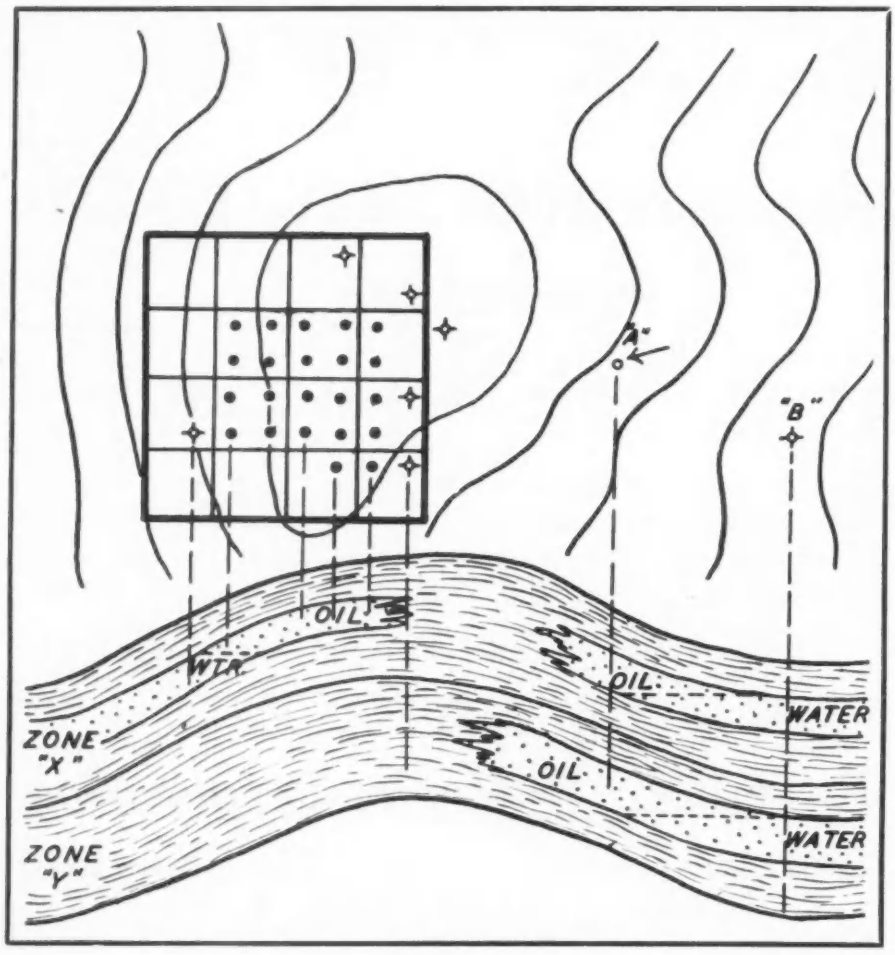

FIGURE 3.

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New Gravity Approach Aids Reef Interpretation

Here's a description of field procedures and interpretive methods used.

By RICHARD A. POHLY
Seismograph Service Corporation, Tulsa, Okla.

In spite of the fact that reef exploration with gravity has been conducted for several years, interpretative methods described in this article have not been employed in the majority of surveys observed. Since a number of gravity surveys using the method of interpretation herein described have resulted in reef discoveries, it is felt that revealing the technique may promote the interest of seismic interpretation in this important field.

The word "reef" shall be confined to the bioherms as described by Cummings and Schrock[1] and discussion restricted to the subsurface equivalent of the modern reefs classified as fringe reefs, barrier reefs, atolls or annular reefs, table reefs, bank reefs and pinnacle reefs. These reefs normally exhibit extreme vertical growth and well defined boundaries and probably include a majority of the known oil or gas producing reefs. Figure 1 is an idealized schematic sketch of a submerged reef. The reef complex has been divided into reef-core, reef-flank and inter-reef.[2]

The Gravity Anomaly. In gravity interpretation, it is customary to use a known or assumed density contrast and compute an anomaly for a simple geometrical form which resembles the geologic structure expected. This theoretical anomaly is then compared with the observed gravity map and similar anomalies are interpreted as evidence of that structure. This method has worked well in most geologic problems, but in the search for reefs, it soon became apparent that the anomalies computed for known reefs did not fit the observed anomalies as well as should be expected.

In 1946, while working with detailed gravity over known reefs in West Texas, we noted that the maximum anomalies were narrower and the curvatures greater on the observed profiles than on the computed curves when the reef anomaly was predominantly maximum, and that flanking minima were invariably present. A series of profiles (Figure 2) across the Jameson reef in Coke County, Texas, illustrates these effects very nicely.[3] However, at that time knowledge of density distribution in reefs was so limited that Hart Brown considered these effects to be from density contrasts near the surface, rather than at reef depth.

Where the reef produced a minimum anomaly it was noted that the observed profile compared favorably with the computed, except for a narrow maximum tendency in the center. No examples of gravity were available to demonstrate this situation, but the Eskota Field in Fisher County, Texas, is remembered as a predominantly minimum anomaly. Figure 3 is a sketch to illustrate the comparison and is very similar to one of the illustrations in a paper by H. Klaus and J. C. Hughes, entitled "Gravity Exploration for Reefs and Other Porosity Maxima." The solid line is the computed curve and the dashed line represents a typical observed curve. Klaus and Hughes show a good example of this same characteristic by superimposing computed curves of the two effects.[4]

After observing the gravity anomalies on a number of the West Texas reefs, the adoption of an empirical anomaly, consisting of a central maximum and surrounding minimum, as the typical gravity expression of a reef appears reasonable. Since this early work on reefs, the author has had an opportunity to apply this theory to the results of more than fifty crew years of detailed gravity work, which has included all of the reef areas of the U. S. and Canada. Almost without exception the reefs in these areas were evidenced by some variation of the double anomaly, and the discovery rate of new reefs by this method of interpretation has been very satisfactory.

An empirical gravity anomaly, no matter how frequently observed, must have a plausible explanation in terms of mass distribution in the subsurface. In the reef problem the wide variation in anomalies would indicate an extreme variation in the relative densities of the various components of the reef complex. Present knowledge of these densities is entirely inadequate and for that reason the following discussion of possible mass distribution must be considered completely theoretical. It is offered for two reasons. In the first place, it fits the observed anomalies and has some support from the limited core density and seismic velocity studies which have been made. In the second place, it may serve to direct the attention of future density studies to the different zones of the reef-complex.

In Figure 4 the schematic reef sketch of Figure 1 is divided into zones of effect. **ZONE 1** is the reef-core, which in most cases contributes the principal gravity anomaly. However, since the relation of its density to that of the surrounding rock has been found to vary from more dense to less dense, our basic anomaly can be either positive or negative.

ZONE 2 includes all of the beds directly above the reef. Isopachs of reef areas have, in many cases, shown thinning of shale beds in this zone which cannot be adequately explained by the theory of differential total

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F. J. C. Caine, Manager, Edmonton Branch (right), during a visit to a well-head "Christmas Tree".

Mr. Mayne (right) confers with A. D. Insley, Manager, Oil & Gas Department

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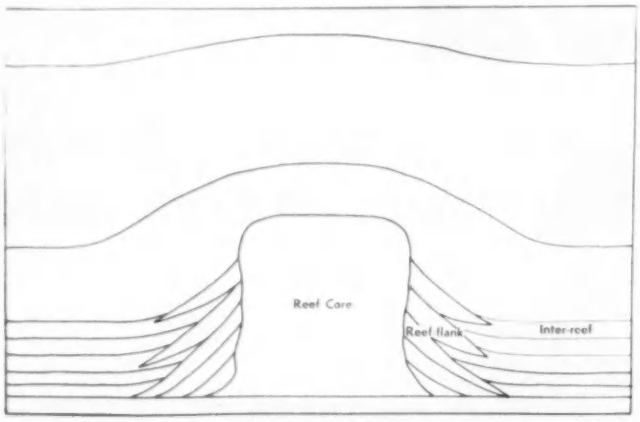

FIGURE 1.
Schematic sketch of a bioherm.

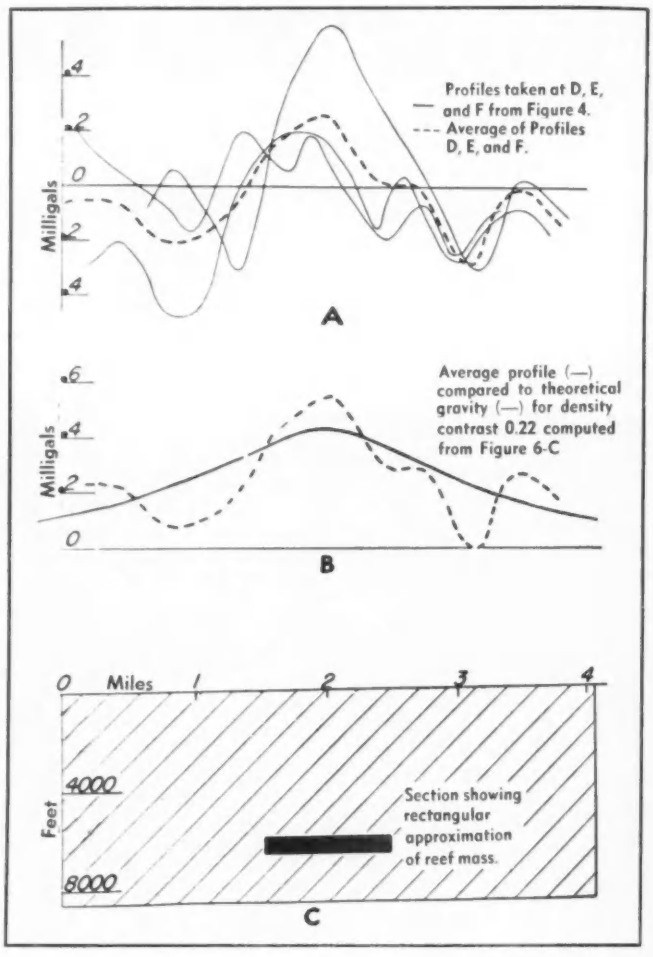
Profiles taken at D, E, and F from Figure 4.
Average of Profiles D, E, and F.
Milligals
A
Average profile (—) compared to theoretical gravity (—) for density contrast 0.22 computed from Figure 6-C
Milligals
B
0 Miles 1 2 3 4
Feet
4000
8000
Section showing rectangular approximation of reef mass.
C

FIGURE 2.
Observed and computed profiles of Jameson reef, Coke County, Texas, (after Hart Brown, *Geophysics*, Vol. XIV, 1949).

compaction. Excessive compaction with a resultant local increase in density may, therefore, occur. It has also been observed that the dips shown for these beds on seismic maps are often greater than those encountered in subsequent drilling. If we consider this to be evidence of local increases in shale densities, the gravity effect of Zone 2 would always be positive and, because of its shallower position, narrower than the effect of the reef-core.

ZONE 3 is the reef-flank. Because of its detrital character, we would expect it to be less dense than the inter-reef and in most cases less dense than the reef-core. Its effect would be predominantly minimum and would have its greatest intensity where the reef-core was extremely dense.

ZONE 4 includes the beds above the reef-flank. Its contribution to the gravity anomaly is questionable, and would depend upon the converse of the compaction theory discussed for Zone 2 to produce lower than normal shale densities. In any case, if this zone contributes any effect it would be of negative sign.

The author recognizes the controversial aspects of these density assumptions and it is probable that many arguments, both pro and con, will be forthcoming, particularly with regard to the zones of compaction. Many will insist that the density contrasts are too slight to produce a measurable effect. This may be true if only a single bed is considered, but only a very small density contrast is required if all of the shale beds between the reef and the surface contribute to the total anomaly. Average densities from well cores and samples would be of questionable value, as demonstrated by Hammer,[5] in establishing representative densities for these beds, and it will probably require some method, such as that described by Neal Smith's paper on borehole gravity measurements,[6] to determine gravity effects of the beds in place before these assumptions can be ultimately supported or refuted.

In summarizing the effects of the zones, it will be noted that the effects of Zones 2, 3 and 4 are consistent in sign, but may vary in intensity, while the effect of Zone 1 may vary in both sign and intensity. Hence, the combined effects of the zones will produce some variation of one of two basic types of total anomalies, depending upon the relative density of the reef-core.

Let us consider first the case of a dense reef-core, and apply the effects of the zones to the Jameson anomaly (Figure 2). The effect of Zone 1 will coincide with the computed curve.

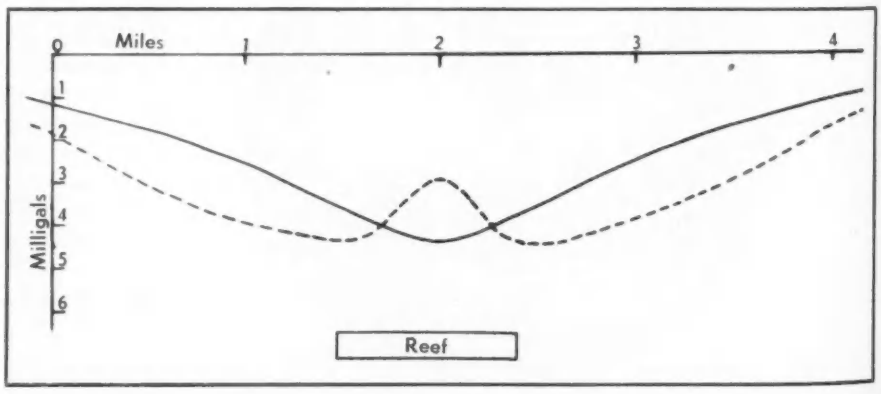

FIGURE 3.
Computed and observed profile of reef with low density core.

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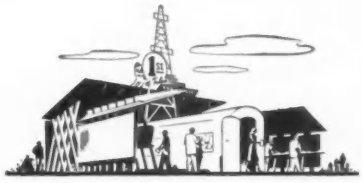

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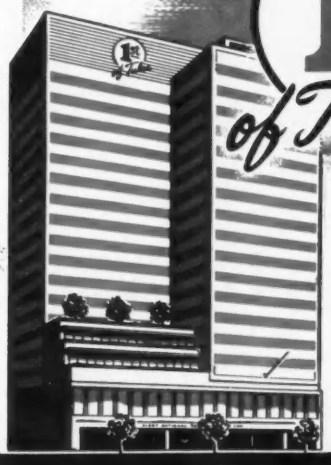

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The effect of Zone 2, since it is positive and from a shallower depth, will add a narrow peak at the apex of the curve. The combined effects of Zones 3 and 4 will be negative, and since they are superimposed upon both sides of the positive curve, will reduce its width and increase the curvature on the flanks.

When the reef-core is less dense than its surroundings, the total anomaly is very different (Figure 3). For a comparison, assume the same conditions of density contrast and depth as those for Jameson. The effects of Zone 1 will be equal, but the computed curve inverted. Zone 2 will produce a similar narrow positive effect at the apex of the curve, and the negative effect of Zones 3 and 4 will simply increase the minimum. The resultant anomaly, while predominantly minimum, preserves the pattern of the central maximum and surrounding minimum and coincides with observed anomalies.

These examples represent the two extremes, and almost any combination of intensities in the two components of the anomaly are possible, including, of course, a mass distribution which would produce no measurable anomaly.

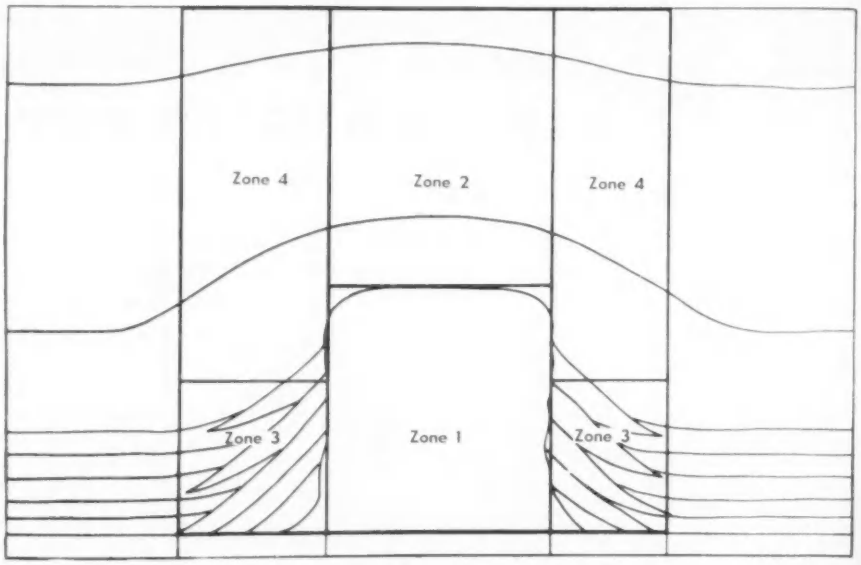

FIGURE 4.
Theoretical zones of density variations which may affect the gravity anomaly.

Example of Reef Gravity. The most useful presentation of a theory in interpretation is to demonstrate its effectiveness in actual exploration. The Weaver field in Clark County, Illinois, provides an excellent example. The area originally was recommended by Dr. George Otto, after mapping a structure in the outcrops of the Shoal Creek coals. On the basis of his recommendation, two wells were drilled slightly west of the center of Section 20 on the crest of the apparent structure. These wells produced small amounts of oil. In July, 1949, a detailed gravity survey was made, covering several townships surrounding this area. Figure 5 is a part of the original Bouguer gravity map constructed as a result of that survey, and shows a portion of T11N, R10W. The solid dots indicate the location of the gravity stations and give a good idea of the station distribution required for this type of problem. The station numbers and values have been omitted to avoid crowding of data on this small scale. Since the gravity values are increasing from east to west, the sharp nose in the vicinity of the northeast corner of Section 30 stands out as a prominent maximum. The flanking minimum is also well defined.

Figure 6 is the residual gravity of the same area, with the well locations

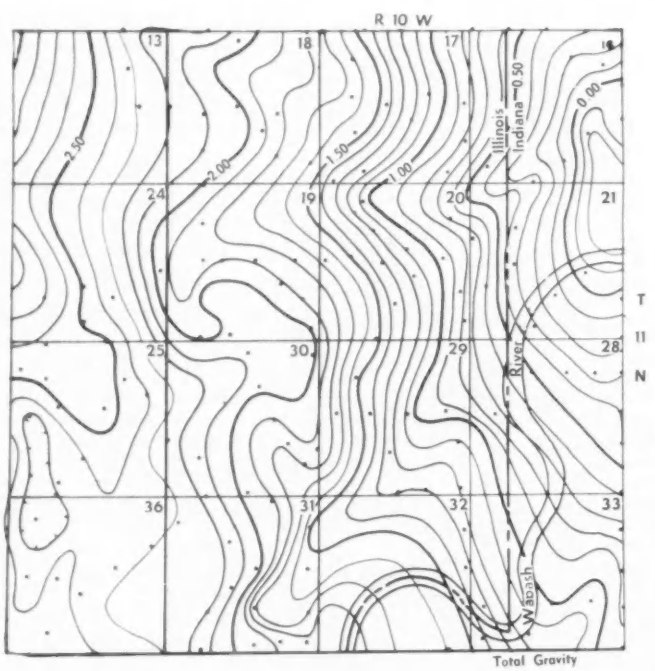

FIGURE 5.
Bouguer gravity in the vicinity of Weaver field, Clark County, Illinois.

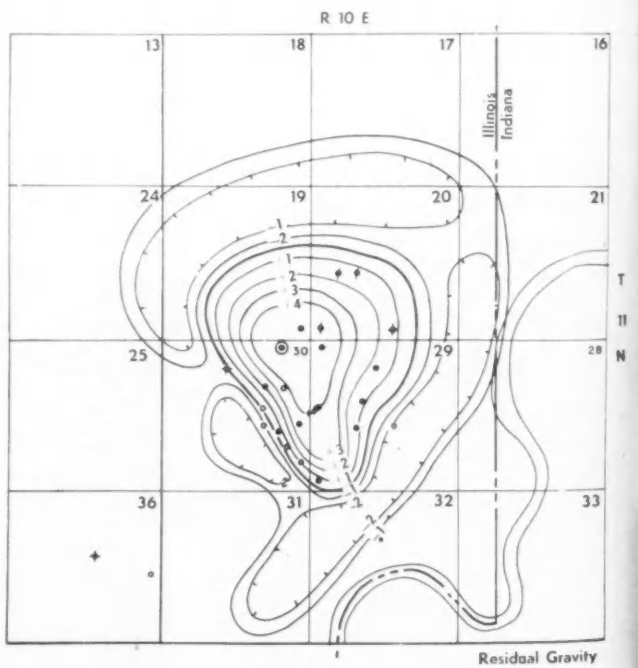

FIGURE 6.
Residual gravity map of Weaver field, Clark County, Illinois.

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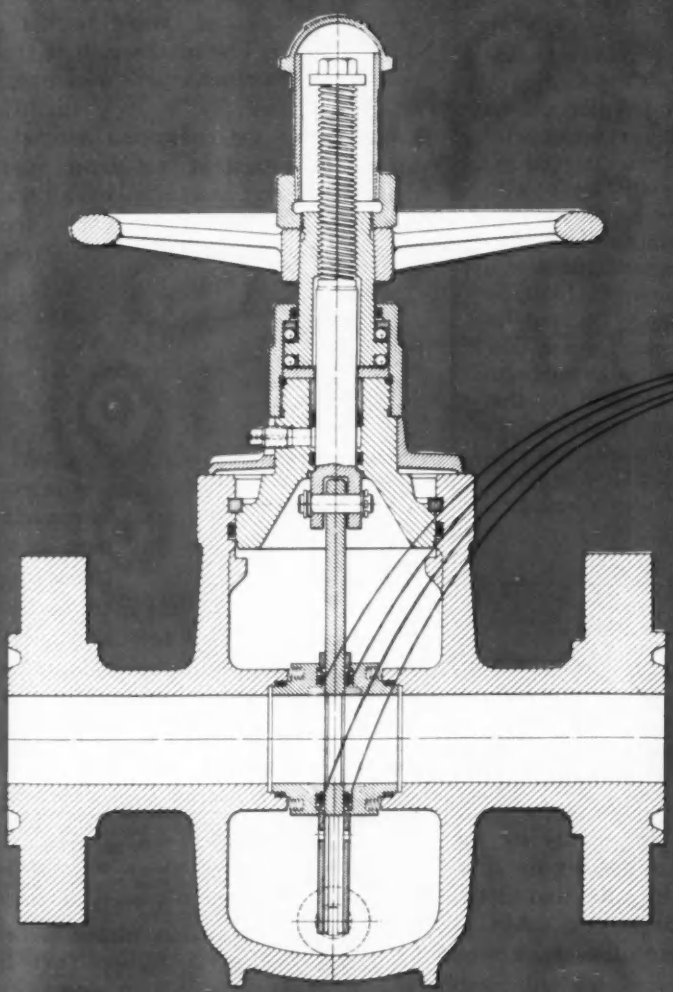
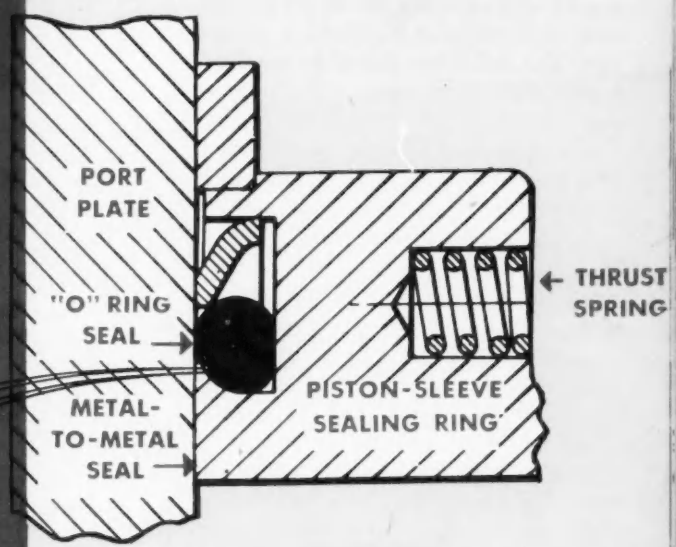


The sealing assembly and port-plate are full-floating, insuring perfect alignment, regardless of line pressure. Flow can be reversed. Ball-bearing mounted stem. Effective "O" ring chamber seals.



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indicated by circles to show the status of drilling, as of April, 1950. The method of constructing this residual from the Bouguer map is discussed below. The circled well in the northeast corner of Section 30 was the first location recommended on gravity. The well in the extreme northwest corner of Section 29 is the highest well in the area. It would appear that the reef may occupy a little more of Section 29 than would have been expected from the gravity.

Field Procedure. The need for extreme detail and accuracy in the field work for reef problems was described by Brown,[7] but he explains that the cost of approximately $150 per square mile is prohibitive for blanket coverage. The following described method is something of a compromise, but secures ample detail and accuracy and has been applied to areas totaling several thousand square miles at an average cost of $32 per square mile.

In this method, the area assigned for a survey is covered with gravity stations spaced at intervals of ¼ mile along lines 1 or 2 miles apart, depending upon the depth of the expected reefs in that area. The spacing of the lines is flexible and advantage is taken of all roads and trails. Cross-country lines are used only when required to maintain a consistent average density of approximately 6 stations per square mile. This average density is increased to approximately 16 stations per square mile wherever anomalous features appear.

Elevations and locations are determined simultaneously with transits, and no vertical angles are used. Traverses are normally less than 6 miles in length, and the maximum allowable error in closure is ½ foot. Hubs are used at all stations.

Gravity values are determined at these hubs with an average accuracy of plus or minus 0.03 milligals through improved technique in drift adjustment and meter reading.

Efficient operation of this method requires that the gravity maps be constructed in the office of the field crew, so that the additional detail on anomalous features can be secured as the work progresses. Any delay will result in lost time, either searching for destroyed stations or in the division of the surveyors' and meter operator's work day into short "fill-in" jobs in scattered areas. This requires a superior party chief who can not only maintain accurate field work and contour maps, but also one who can recognize significant anomalies and plan the most efficient detailed coverage in the field. The maps should also be inspected frequently by the supervisor or person making the final interpretation to be sure that detail is adequate for that purpose, and that no possible reef anomalies have been overlooked.

About the Author

RICHARD A. POHLY attended Albion College and the University of Michigan from 1931 to 1935, where he majored in electrical engineering. This training was later augmented by extension courses in geology and geophysics from The Pennsylvania State College and the University of Texas. In 1937 he was employed by Shell Oil Company in the Research Division of the Geophysical Department and since 1941 has been engaged exclusively in gravity work with contract geophysical companies. In 1946, he organized the Global Exploration Company and served as general manager. In 1950, he organized a Gravity Division for Seismograph Service Corporation, and is now serving as manager of the Gravity Division for that company. He is a member of the American Geophysical Union, the Society of Exploration Geophysicists and the Tulsa Geological Society.

Residual Methods. The final reports of most gravity surveys normally include a residual map. This map may be anything from a sketch map of the interpreter's ideas, to a detailed map of the anomalies after removal of the regional effects by elaborate mathematical treatment. Perhaps the most common method of constructing residual maps is some application of the template or "average value" method. This method invariably produces small anomalies of opposite sign on the flanks of the principal anomalies, and for that reason is not recommended for reef problems where the negative flank anomalies are critical. We prefer to make reef interpretations from the Bouguer gravity map and construct residuals by the "smooth contour" method only as a graphic representation of the local anomalies identified on the Bouguer map.

Conclusion. It should be pointed out that certain precautions must be observed in the interpretation of reef gravity anomalies. Either maxima or minima found in areas where reefs are to be expected should be carefully detailed. The total width of the combined maximum and minimum, or double anomaly, is only slightly greater than the computed anomaly for a single mass at reef depth, and many valid reef anomalies have been discarded in the past because the maximum was considered too narrow to be evidence of a reef.

The need for additional studies of densities in the reef-complex cannot be over emphasized, but until that information is available, a review of the detailed gravity surveys over known reefs will reveal narrow maxima surrounded by broad low intensity minima in many cases where reef anomalies had heretofore been considered absent.

The reliability of this more or less universal pattern in reef anomalies, plus the low cost of gravity surveys should make the gravity meter a useful tool in reef exploration.

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AUTHOR'S NOTE

Much of the above material was presented before the 20th annual meeting of the Society of Exploration Geophysicists in Chicago in April, 1950, under the title: "Significant Gravity Pattern in Reef Anomalies" but was never published. It is felt publication in World Oil will also permit revision of ideas based on the experience of the three intervening years.

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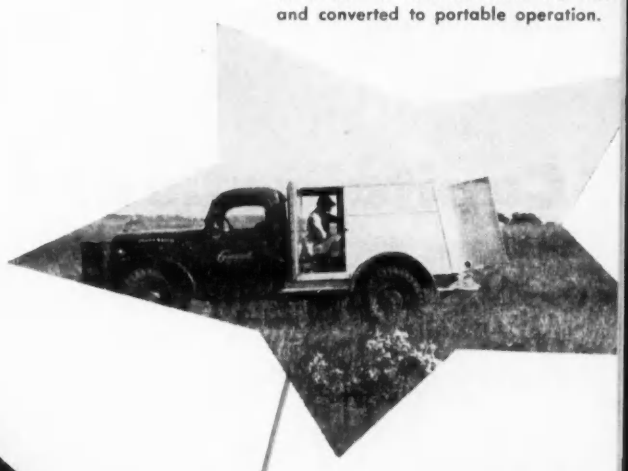
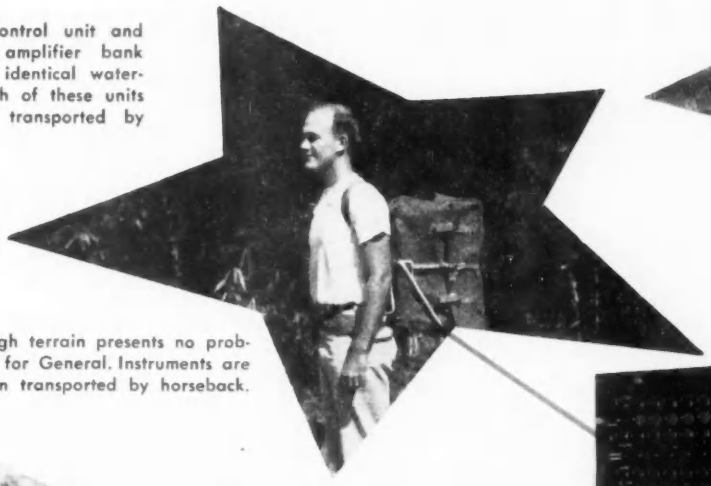
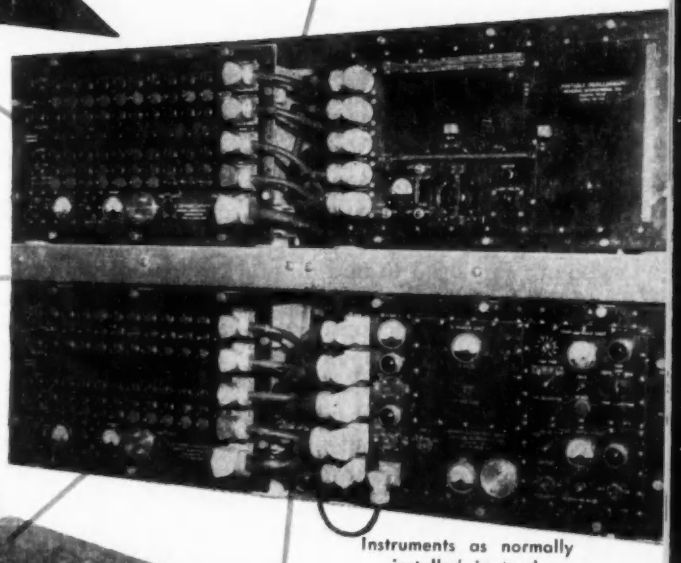


2 The Camera, control unit and each 12-trace amplifier bank are housed in identical watertight cases. Each of these units can be easily transported by one man.



3 Rough terrain presents no problem for General. Instruments are often transported by horseback.



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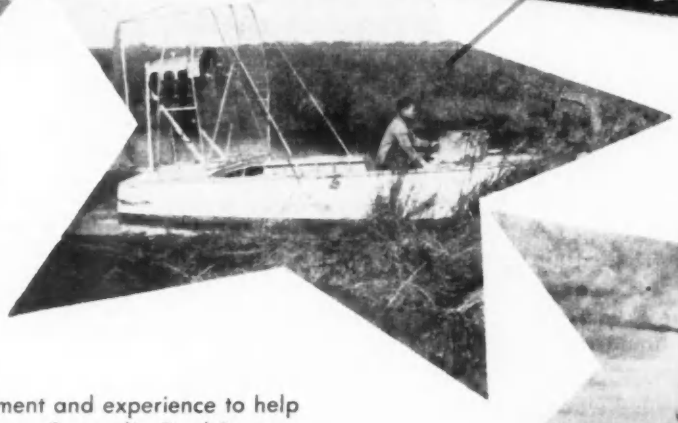
4 In swamplands, General crews utilize air boats, marsh buggies, skiffs, weasels and other appropriate means of transportation.



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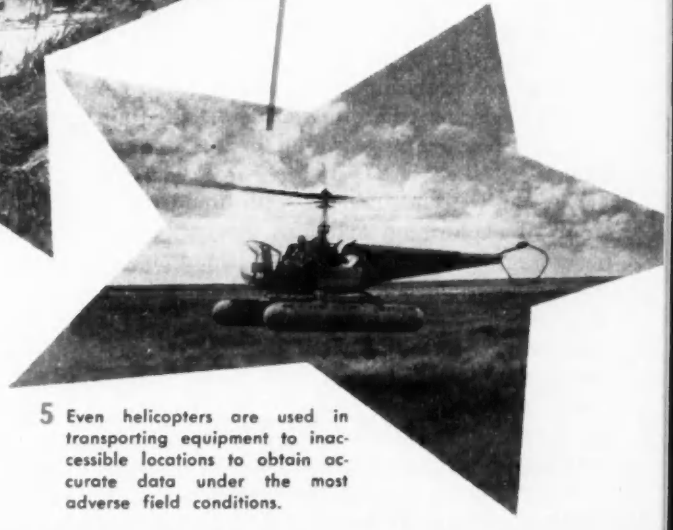

5 Even helicopters are used in transporting equipment to inaccessible locations to obtain accurate data under the most adverse field conditions.

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Capitalization of Exploration Expenses

By D. L. SHEPHERD
Union Oil Company of California, Los Angeles

IT WAS SEEN in Part 1 that keeping of proper records for the allocation of capitalized exploration costs imposes a tremendous administrative burden on oil companies. It is probably also apparent that the solution to the problems which inevitably arise must be supplied not only by a company's tax and accounting departments, but also by its geologists and geophysicists and other highly paid technical personnel who are employed to find oil and gas and not to make guesses as to the application of instructions which are confusing and ambiguous.

Presence of these many problems also makes it clear that oil companies can no longer safely adopt the form of per diem arrangements with geophysical companies by which the latter carry on extensive work for a particular company and under which a survey pattern develops as the exploring work goes along. Such a contract with only general provisions for payment does not permit the necessary identification of costs relating to a particular project or area of interest where property is subsequently acquired or retained.

Anyone well acquainted with the scope of exploration activities would not disagree with the assertion that the Bureau in I. T. 4006 has not clarified its earlier ruling to any great extent and with the assertion that such clarification is impossible in a published ruling. Present requirement of capitalizing exploration costs for federal tax purposes overlooks to a great extent the point that no two oil companies maintain the same type of accounting records and that geophysical records and terminology vary from company to company.

Some seismologists may refer to an area of interest as a prospect after the locale in which they are operating even though the seismograph work being done in that locale may be separated by as many as 20 miles. Moreover, the classification of exploration operations and costs is so clearly a matter of judgment and practice that any fixed tests must necessarily be arbitrary in their application.

At the present time the firm position of the Bureau indicates the improbability of administrative correction and places the problem squarely before the petroleum industry to choose between litigation and legislation to reestablish the treatment which prevailed prior to 1942 of considering all exploration expenditures as ordinary and necessary business expenses in the year in which they are incurred.

The course of litigation is uncertain and expensive, and would delay resolving the matter for several years. For these reasons, industry tax committees believe that legislation is the preferable means for the industry to attain its objectives. The need for legislation is supported by the fact that the executive and administrative departments of the federal government, other than the Treasury Department, have been squarely behind every effort made by the industry to stimulate and accelerate the discovery of more oil.

The industry is hopeful that Congress will be receptive to the idea because in the 1951 amendments to the Revenue Code it alleviated a somewhat similar situation which prevailed with respect to the treatment of exploration activities in the case of mining companies.

Part 2

To accomplish the industry tax committees' recommendations and the recommendation of the Paley report, it is proposed that there be added to Section 23 of the Internal Revenue Code (which section deals with deductions) a new subsection providing for the deduction of all expenditures paid or incurred during any taxable year for the purpose of ascertaining the existence, location or extent of any deposits of oil and gas. Recognizing that due to unusual circumstances there may be taxpayers who would prefer to capitalize exploration costs, the proposed amendment would also provide for an election to capitalize such costs with the proviso that an election once made would be binding for all future years.

If such an amendment were adopted the impact on the flow of revenue into the U. S. treasury would not be substantial when averaged over a period of several years. The reason for this is that the minimum estimate of the proportion of exploration expenditures which are ultimately recoverable as deductions under the current practice, either as ordinary and necessary expenses, losses upon abandonment or losses of useful value, is 96 percent. The remaining 4 percent is that portion of the exploration expenditures which finds its way into the cost of lands or leases under which oil or gas or both are discovered. As such, it becomes a deduction in the computation of taxable income through deductions for depletion based upon cost, but because percentage depletion is in lieu of, rather than in addition to, cost depletion, the effect is that this

4 percent of exploration expenditures is lost as a deduction to taxpayers. Thus the only effect which the proposed amendment would have on the flow of revenue to the federal government would be the loss of tax arising from the deduction of 4 percent of exploration expenditures and the shifting of the deduction for the 96 percent to the years paid or incurred.

Also, it should be noted that the procedures under the proposed amendment would be simple whereas the procedures under current Bureau practice are confusing and require unnecessary expense and delays.

The foremost principle of a sound American petroleum policy must be to sustain our domestic supply of petroleum and to maintain the American system of competitive free enterprise at home and abroad. Our country's rise to the present position of world industrial preeminence has been made possible only by a parallel growth in the petroleum industry to provide the fuel and lubricants consumed. In achieving this position, it was necessary to explore and discover, develop and inevitably to exhaust countless petroleum deposits. Because of the desperate need which the report found to exist for the development of new petroleum reserves the Paley report of 1952 by the President's Materials Policy Commission recommended that exploration and development costs for minerals should be classed as an expense for tax purposes.

In recognition of the direct incentive this treatment provides for capital to take risk in highly uncertain field, it was further recognized that such expensing would be especially important to the petroleum industry whose annual exploration and development costs are measured in terms of billions of dollars.

Additional dollars made available to the petroleum industry through the deduction of exploration expenditures accomplished by the proposed amendment to the Internal Revenue Code would be available for more exploration and would result in the greater development of petroleum reserves. These additional dollars would also naturally increase job opportunities for professional, administrative and clerical personnel, and thereby assure a high level of employment in the petroleum industry.

About the Author

DEWEY L. SHEPHERD is manager of the Tax Division of the Union Oil Company of California at Los Angeles. A graduate in accounting and business administration of Southeastern University and of National University Law School, he is a member of the bar of Virginia. Prior to joining Union in 1936, he worked for more than 16 years in various capacities in the Bureau of Internal Revenue. He is on the executive committee of the Standing Committee on Federal Taxation of the Mid-Continent Oil and Gas Association, a member of the General Tax Committee and chairman of the Federal and State Income Tax Committee of the Western Oil and Gas Association.

The matter of presenting the proposed amendment for enactment by the Congress is one which necessarily must be initiated by persons who have a firm understanding of the effect which the present requirement of capitalization has on petroleum exploration activities, but every American citizen should realize that if the pressure on the petroleum industry to develop more oil reserves is to be successfully met by the exploration of unproven lands and the drilling of new wells, the federal income tax treatment of exploration activities must be changed to provide encouragement rather than discouragement of such exploration and development. Widespread understanding and acceptance of this fact is vital to the success of the industry's proposal and thus to the promise of adequate future petroleum reserves.

ACKNOWLEDGMENT

This article is based on a talk given by the author Feb. 5, 1953 before the Pacific Section of the AAPG at Los Angeles.

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Exploratory Drilling Continues Record-Breaking Pace for Year

By CECIL W. SMITH, WORLD OIL Staff

THE VOLUME OF exploratory drilling done so far this year amounts to about 9 percent more than was accomplished during the same period of 1952. But the margin of difference is showing signs of dwindling. A month earlier, the lead in 1953 amounted to more than 13 percent. However, there seems to be little reason to believe that this year's exploratory campaign will not become the greatest in history.

March's activity resulted in the completion of 871 exploratory tests, which was 48 more than were recorded in February and seven tests more than were completed in March of last year. Of the latest month's wells, 162 proved to be commercial producers of oil or gas, and the remaining 709 were recorded as failures.

In the first quarter of 1953, a total of 2714 exploratory tests were completed and they amounted to 9 percent more than the 2490 credited to the same period of 1952. Of those tests, a total of 520 were producers this year, or 19.2 percent of the total drilled, while last year only 491 proved successful, but they amounted to a slightly better 19.7 percent of the total.

Exploration in March resulted in the discovery of 108 new oil pools, which was a slightly better record than February's 102.

Summary of Results of Exploratory Drilling

ITEM	Mar., 1953	Feb., 1953	THREE MONTHS January-March 1953	1952	Percent Diff.
Oil Discoveries	108	102	341	329	+ 3.6
New Fields	70	77	247	241	+ 2.5
New Pays	38	25	94	88	+ 6.8
Distillate Discoveries	10	6	32	29	+ 10.3
New Fields	6	5	22	26	— 15.4
New Pays	4	1	10	3	+233.3
Gas Discoveries	20	26	63	51	+ 23.5
New Fields	17	22	54	40	+ 35.0
New Pays	3	4	9	11	— 18.2
Total Discoveries	138	134	436	409	+ 6.6
Extensions to Fields	24	31	84	82	+ 2.4
Oil Fields	19	26	71	70	+ 1.4
Distillate Fields	3		4	3	+ 33.3
Gas Fields	2	5	9	9	
Total Prod. Tests	162	165	520	491	+ 5.9
Dry Holes	709	658	2,194	1,999	+ 9.8
Wildcats	695	648	2,158	1,889	+ 14.2
New Pays				6	—100.0
Outposts	14	10	36	104	— 65.4
Total Expl'tory Tests	871	823	2,714	2,490	+ 9.0
Percent Productive	18.6	20.0	19.2	19.7	
Percent Dry	81.4	80.0	80.8	80.3	

Results of Exploration Drilling in March and First 3 Months, 1953-1952, by Districts

State or District	MONTH OF MARCH, 1953													FIRST THREE MONTHS, 1953																	
	Productive Tests									Total Productive	Unproductive Tests			Total Exploratory Tests	Productive Tests									Total Productive		Unproductive Tests			Total Dry		Total Exploratory Tests	
	New Fields			New Pays			Extensions								New Fields			New Pays			Extensions										
	Oil	Dis.	Gas	Oil	Dis.	Gas	Oil	Dis.	Gas		Wildcats	New Pays	Outposts		Oil	Dis.	Gas	Oil	Dis.	Gas	Oil	Dis.	Gas	3 Mo. 1953	3 Mo. 1952	Wildcats	New Pays	Outposts	3 Mo. 1953	3 Mo. 1952	3 Mo. 1953	3 Mo. 1952
Alabama											5			5											1	16			16	6	16	7
Arizona																										3			3		3	
Arkansas	1									1	10			11	4			6						10	9	31			31	14	41	23
California	3			2		2	4			11	31		5	47	5			5		3	6			19	26	98		12	110	92	129	118
Colorado	2		2							4	21			25	4		4							8	6	71			71	36	79	42
Florida											4			4												9			9	1	9	1
Georgia											1			1												1			1		1	
Idaho											1			1												1			1		1	
Illinois											22			22	3			4			7			14	21	95			95	85	109	106
Indiana	2									2	20			22	6		1				1			8	5	73			73	89	81	94
Kansas	15		3							18	81			99	39		7	1						47	33	211			211	179	258	212
Kentucky	3									3	9			12	8		1							9	6	24			24	24	33	30
Louisiana	2	1		6	1					10	26		1	37	6	3		10	3		4	1	1	28	28	94		2	96	81	124	109
North Louisiana				1						1	12			13				1			2			3	13	44		1	45	41	48	54
South Louisiana	2	1		5	1					9	14		1	24	6	3		9	3		2	1	1	25	15	50		1	51	40	76	55
Michigan	1									1	18			19	4			1			1			6	10	53			53	52	59	62
Mississippi	1	1								2	12			14	3	1	1	3			1			9	10	42		1	43	43	52	53
Missouri																										2			2	3	2	3
Montana	1									1	3			4	2		1							3	2	19			19	11	22	13
Nebraska	1									1	8			9	4									4	3	32			32	27	36	30
Nevada																										1			1		1	
New Mexico	1						2			3	8			11	4		4	1			4			13	12	39			39	21	52	33
North Dakota											3			3											3	12			12	2	12	5
Ohio											4			4							1			1	1	8			8	9	9	10
Oklahoma	5		4	3			6			18	61			79	23	2	6	11			14		1	57	40	175			175	175	232	215
Pennsylvania									1	1				1									1	1						2	1	2
South Dakota											2			2												2			2		2	
Texas	30	4	7	27	3	1	7	3	1	83	337		8	428	128	16	27	53	7	6	32	3	6	278	268	1,008		21	1029	1009	1307	1277
Dist. 1 S. Central	2			1						3	19		1	23	4	1	1	1						7	8	72		3	75	77	82	85
Dist. 2 Middle Gulf	1	2		1						4	30		1	35	6	2		2						10	31	69		1	70	73	80	104
Dist. 3 Upper Gulf				7	3	1		2	1	14	28		5	47	9	4	1	11	5	3	4	2	4	43	38	83		14	97	80	140	118
Dist. 4 L. Gulf-S.W.		1	3	6				1		11	32		1	44	9	7	13	12	2	3	1	1	2	50	22	119		3	122	108	172	130
Dist. 5 E. Central	1		1	1						3	11			14	1		1	1						3	3	35			35	30	38	33
Dist. 6 Northeast				2						2	12			14	2			3						5	11	36			36	36	41	47
Dist. 7-B N. Cent.	12		2	2			3			19	73			92	42		8	9			7			66	52	234			234	205	300	257
Dist. 7-C W. Cent.	2	1		1			1			5	27			32	12	2	1	5			2			22	29	85			85	107	107	136
Dist. 8 West	5			1			2			8	28			36	19		1	1			13			34	28	77			77	97	111	125
Dist. 9 North	7		1	5			1			14	77			91	24		1	8			4			37	45	198			198	179	235	224
Dist. 10 Panhandle																					1			1	1					17	1	18
Utah			1							1	5			6	2		1							3		15			15	12	18	12
West Virginia																									1					1		2
Wyoming	2									2	3			5	2									2	6	23			23	25	25	31
Total U.S.	70	6	17	38	4	3	19	3	2	162	695		14	871	247	22	54	94	10	9	71	4	9	520	491	2158		36	2194	1999	2714	2490

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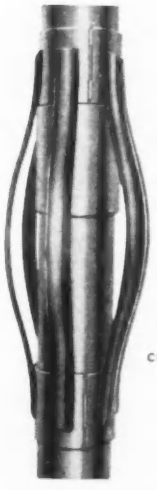

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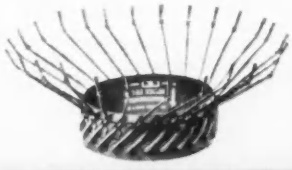

B AND W WALL CLEANING GUIDE

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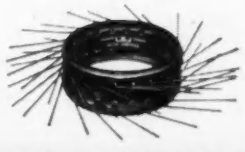

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ARKANSAS—NEW OIL FIELD

Union County. Don D. Montgomery et al's Brasher 1, C SW NE 14-17s-16w, flowed 192 barrels from Cotton Valley sand, Jurassic 4941-50 feet, 10/64-inch, 47.6-gravity, completed 3-16-53, TD 6819.

CALIFORNIA—NEW OIL FIELDS

Kern County, Belgian Anticline, Northwest field. Moriqui Exploration Co. & A. J. West's Anderson 4, SW NE 15-30s-21e, flowed 245 barrels from Oceanic sand, Oligocene 3450-90 feet, 12/64-inch, 37.2-gravity, completed 3-1-53, TD 3490.

Santiago Creek field. Bankline Oil Co.'s Metson 47-24, in 24-11n-23w, pumped 60 barrels oil and 10 barrels water from 1013-1450 feet, 11.8-gravity, completed 3-14-53, TD 1450.

Tejon Flats field. Union Oil Co.'s Reserve-Kerr 46-24, in 24-11n-19w, pumped 24 barrels oil from 6912-19 feet, 33-gravity, completed 3-19-53, TD 7076.

CALIFORNIA—NEW OIL PAYS

Los Angeles County, Leffingwell field. Hathaway Company's Woodward 1, SE NE 11-3s-11w, flowed 250 barrels from Hathaway sand, Miocene 8486-8686 feet, 35-6-gravity, completed 3-16-53, TD 8792.

Santa Barbara County, Cat Canyon field. Standard Oil Co.'s Alexander 164, in 21-9n-33w, pumped 394 barrels from Sisqouc sand 3539-3660 feet, 23-gravity, completed 3-5-53, TD 3940.

CALIFORNIA—OIL FIELD EXTENSIONS

Kern County, Arvin field. Talisman Oil Co.'s Jewett 1 (17A), in 23-31s-29e, Old Well Worked Over, north extension, pumped 58 barrels from Cattani sand, Miocene 6904-58 feet, 26.8-gravity, completed 3-2-53, TD 7080.

Los Lobos field. Richfield Oil Corp.'s San Emidio 41-28A, NE NW 28-11n-22w, ½-mile southeast extension, pumped 129 barrels from Etchegoin sand, Pliocene 7148-96 feet, 18/64-inch, 16.2-gravity, completed 3-8-53, TD 7207.

Los Angeles County, Brea field. Union Oil Co.'s Lindauer 1, NE SE 32-2s-10w, 1-mile northeast extension, pumped 75 barrels from 4235-4855 feet, 23.1-gravity, completed 3-27-53, TD 7334.

Castaic Hills field. Standard Oil Co., Trousdale & Sterling's Villa 45, NE SW 35-5n-17w, ½-mile west extension, flowed 413 barrels from 6330-85 feet, 15/64-inch, 30.5-gravity, completed 3-2-53, TD 6550.

CALIFORNIA—NEW GAS PAYS

Kings County, Alpaugh field. W. W. Holmes, Operator's Cutter Unit 1, in 29-23s-22e, Old Well Drilled Deeper, flowed 7.5 million from Mya sand 2770, 2-inch, completed 2-23-53, TD 3686.

Madera County, Chowchilla field. Tide Water Associated Oil Co.'s Redman-Stone 1-20, SW NW 20-10s-14e, flowed 7.0 million from Lower Zilch sand 2894-2904 feet, 40/64-inch, completed 2-21-53, TD 2971.

COLORADO—NEW OIL FIELDS

Logan County. Ryan Oil Co.'s State 1, NW NW NW 16-8n-54w, flowed 240 barrels from Dakota "J" sand, Upper Cretaceous 5383-87 feet, 38/64-inch, completed 3-28-53, TD 5433.

Weld County. Midwest Oil Co.'s UHL 1, NW NW NW 22-11n-56w, pumped 132 barrels from Dakota "D" sand, Upper Cretaceous 6020-30 feet, 38-gravity, completed 3-24-53, TD 6450.

COLORADO—NEW GAS FIELDS

Logan County. Earle M. Craig, Jr., & Don Johnston Drilling Co.'s P. Budin 1, SW SW NE 6-8n-54w, flowed 9.0 million from Dakota "J" sand, Upper Cretaceous 5367-68 feet, open, completed 3-17-53, TD 5368.

Weld County, Empire Reservoir area. Sherrod & Apperson's County 1, NE SE SW 1-3n-61w, flowed 2.0 million from Dakota "J" sand, Upper Cretaceous 6416-62 feet, completed 3-6-53, TD 6462.

INDIANA—NEW OIL FIELDS

Gibson County. Paco Petroleum-C. S. Higgins-F. T. Whittinghill, Jr.,-Davison & Co.'s Bolin Community 1, NW SE NE 19-2s-10w, pumped 225 barrels from Aux Vases lime, Mississippian 2042-51 feet, TD 2051.

Vanderburgh County. M. L. Vance's Leola Rustin 1, NE SE NW 5-5s-10w, pumped 35 barrels oil and 20 barrels water from O'Hara lime, Mississippian 2276-77 feet, TD 2356.

KANSAS—NEW OIL FIELDS

Barber County, Amber Creek field. W. J. Coppinger's Herndon 1, NE NE SW 36-30s-12w, pumped 28 barrels from Mississippi lime, Mississippian 4296-4324 feet, TD 4800.

Barton County, Fleske field. Harms & Knight's Fleske 1, SW SW NW 3-20s-15w, pumped 19 barrels from Lansing lime, Pennsylvanian 3457-74 feet, TD 3674.

Unnamed field. Overland Drilling Co.'s Ames 1, NE NW SE 25-18s-11w, pumped 25 barrels from Arbuckle lime, Ordovician 3304-11 feet, TD 3311.

Ellis County, Wheatland, Southwest field. Peel-Hardman's Dumler 1, SW SW SW 19-15s-17w, pumped 331 barrels from Arbuckle lime, Ordovician 3556-63 feet, TD 3563.

Unnamed field. K. A. Ellison's Hertel 1, SW SW NE 1-14s-20w, pumped 20 barrels from Arbuckle lime, Ordovician 3864-72 feet, TD 3885.

Marion County. Beaumont Petroleum Co.'s Edmonds 1, SE SE NW 31-22s-4e, pumped 25 barrels from Mississippi lime, Mississippian 2472-74 feet, TD 2474.

Pawnee County, Oro field. M. B. Armer's Ellis 1, SE SE NE 9-20s-19w, pumped 651 barrels from Conglomerate, Pennsylvanian 4204-20 feet, TD 4224.

Rice County. Tom Allan's Mayer 1, SE SW SE 4-22s-8w, pumped 23 barrels from Mississippi lime, Mississippian 3385-97 feet, TD 3397.

Rooks County, Colby field. Trans-Era Petroleum, Inc.'s Colby 1, NE NE SW 27-10s-17w, pumped 85 barrels from Lansing lime, Pennsylvanian 3374-86 feet, TD 3678.

Unnamed field. Heatman & Co.'s Ganoung 1, NE NE SE 31-9s-17w, pumped 97 barrels from Conglomerate, Pennsylvanian 3535-55 feet, TD 3599.

Russell County, Fossil Creek field. Murfin Drilling Co.'s Boxberger 1, NE NE NE 11-14s-14w, pumped 25 barrels from Tarkio sand 2341-49 feet, TD 2349.

Sheridan County, Wessell field. West-Pan Hydrocarbon's Wessell 1, SW NW NW 27-6s-29w, pumped 216 barrels from Lansing-Kansas City lime, Pennsylvanian 4002-18 feet, TD 4720.

Stafford County, Radke field. Westgate-Greenland Oil Co.'s Radke 1, NW NW NW 25-23s-14w, pumped 110 barrels from Lansing lime, Pennsylvanian 3688-3700 feet, TD 4100.

Unnamed field. Helmerich & Payne's Toland 7, NE NE NE 10-25s-14w, pumped 131 barrels from Viola lime, Ordovician 4112-22 feet, TD 4183.

Trego County, Spaulding field. Imperial Drilling's Spaulding 1-B, NW NW NE 1-11s-21w, pumped 20 barrels from Lansing-Kansas City lime, Pennsylvanian 2573-80 feet, TD 3715.

KANSAS—NEW GAS FIELDS

Clark County. Peters-Writer-Christenson's Theis 1, SW SW NE 23-34s-25w, flowed 5.0 million from Chester lime, Mississippian 5670-5756 feet, open, TD 6113.

Morton County, Westola field. Colorado Interstate Gas Co. & Hartman's Stoops 1, NW SW NW 5-32s-42w, flowed 12.5 million from Lansing lime, Pennsylvanian 3534-44 feet, TD 5269.

Rush County, Reichel field. Morrison Drilling Co.'s Reichel 1, SW NE WE 23-17s-17w, flowed 25.0 million from Lansing lime, Pennsylvanian 3393-3429 feet, open, TD 3476.

KENTUCKY—NEW OIL FIELDS

Henderson County. Slagter Producing Co.'s Pauline Barra 1, in 12-0-22, pumped 192 barrels from McClosky lime, Mississippian 2583-90 feet, TD 2608.

Hopkins County. Westfall-Sargent & Post's Ben H. Parker 1, NE SE SE 19-L-25, pumped 168 barrels from Lower Renalt lime, Mississippian 2828-36, Middle O'Hara 2944-52 and Lower O'Hara 2976-92 feet, TD 3042.

Webster County. Barron Kidd's H. C. Griffith 1, in 14-N-24, pumped 32 barrels from Aux Vases lime, Mississippian 2572-2604 feet, TD 2685.

NORTH LOUISIANA—NEW OIL PAY

Bossier Parish, Redland field. Continental Oil Co.'s C. N. Stewart 1, in 19-23n-12w, flowed 90 barrels from Travis Peak sand, Lower Cretaceous 7377-87 feet, ¼-inch, 44-gravity, completed 3-13-53, TD 7515.

SOUTH LOUISIANA—NEW OIL FIELDS

St. Landry Parish, Cortableau area. Stanolind Oil & Gas Co.'s St. Landry Parish School Board 1, in 16-6s-6e, flowed 271 barrels from 12,280-290 and 12,269-280 feet, 10/64-inch 46.2-gravity, completed 3-13-53, TD 13,643.

St. Charles Parish, East Paradise area. Pan American Production Co.'s L. B. Simoneaux 1, in 20-14s-21e, flowed 420 barrels from Miocene sand 10,325-338 feet, 12/64-inch, 38.8-gravity, completed 3-10-53, TD 11,235.

SOUTH LOUISIANA—NEW OIL PAYS

Calcasieu Parish, Iowa field. Louis J. Roussel's Haggart 3, in 11-9s-7w, flowed 275 barrels from Lower Miocene sand, Miocene 11,150-180 feet, 10/64-inch, 50.8-gravity, completed 3-23-53, TD 11,222.

Cameron Parish, Cameron field. Stanolind's J. A. Davis 1-B, in 32-14s-9w, flowed 174 barrels from 10,800-810 feet, 8/64-inch, 33.7-gravity, completed 3-15-53, TD 11,600.

Iberia Parish, Weeks Island field. Shell's Weeks-Gall Unit 1-1, in 12-14s-6e, flowed 320 barrels from 17,038-122 feet, 17/64-inch, 39.2-gravity, completed 3-11-53, TD 17,183.

Iberville Parish, Bayou des Glaise field. Humble's Wilbert Mineral Corp. et al 2-C, in 77-8s-8e, flowed 395 barrels from Lower Miocene sand, Miocene 11,031 068-feet, 10/64-inch, 36.4-gravity, completed 3-1-53, TD 11,081.

St. Charles Parish, Norco field. The California Co.'s U. S. A. 2, in 46-12s-8e, flowed 52 barrels from 9236-45 feet, 8/64-inch, 34-gravity, completed 3-1-53, TD 10,307.

SOUTH LOUISIANA—NEW DISTILLATE FIELD

Terrebonne Parish, Halter Island area. Shell Oil Co.'s State Lease 2077-1, in 19s-12e, Old Well Worked Over, flowed 38 barrels distillate and 2.9 million from 7540-49 feet, 13/64-inch, 57-gravity, completed 3-15-53, TD 12,750.

SOUTH LOUISIANA—NEW DISTILLATE PAY

Acadia Parish, Branch, Northwest field. Sunray Oil Corp.'s Frank T. Daley et al 1, in 44-8s-2e, flowed 80 barrels distillate and 1.7 million from 10,826-838 and 10,812-818 feet, 10/64-inch, 56-gravity, completed 3-13-53, TD 10,905.

MICHIGAN—NEW OIL FIELD

Jackson County. Allied Investments, Inc.'s Hubbard 1, SW SW SW 36-3s-3w, Concord Township, pumped 10 barrels from Traverse lime, Devonian 1627-28 feet, TD 1628.

MISSISSIPPI—NEW OIL FIELD

Jefferson County, "Idlewild" field. Lyle Cashion Co. et al's Gordon & Stowers-Armstrong Unit 1, in 17-9n-1w, flowed 100 barrels from Artman (Wilcox) sand, Eocene 5326-28 feet, 10/64-inch, 41-gravity, completed 3-14-53, TD 6055.

MISSISSIPPI—NEW DISTILLATE FIELD

Chickasaw County, "Trebloc" field. Carter Oil Co.'s Clem Baskin Heirs 1, C NE NW 19-14s-5e, flowed 30 barrels distillate and 6.2 million from Carter sand, Mississippian 4301-4437 feet, ½-inch, 53.7-gravity, completed 3-16-53, TD 5187.

MONTANA—NEW OIL FIELD

Carbon County. Cities Service Oil Co.'s Government 1, NW SW 33-6s-21e, pumped 20 barrels oil and 100 barrels water from Tensleep-Phosphoria sand, Pennsylvanian 7926-58 and 7980-8002

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feet, 34-gravity, completed 3-7-53, TD 8261.

NEBRASKA—NEW OIL FIELD

Kimball County. Anderson-Prichard Oil Co. et al's State 1, NW NW NW 36-15n-56w, pumped 90 barrels oil and 60 barrels water from Dakota "J" sand, Upper Cretaceous 6329-39 feet, 38-gravity, completed 3-8-53, TD 6400.

NEW MEXICO—NEW OIL FIELD

Lea County. Lawton Oil Corp.'s State "L" 1, in 30-16s-36e, flowed 168 barrels from Pennsylvanian 11,430-464 feet, ¼-inch, 42.0-gravity, completed 3-5-53, TD 11,984.

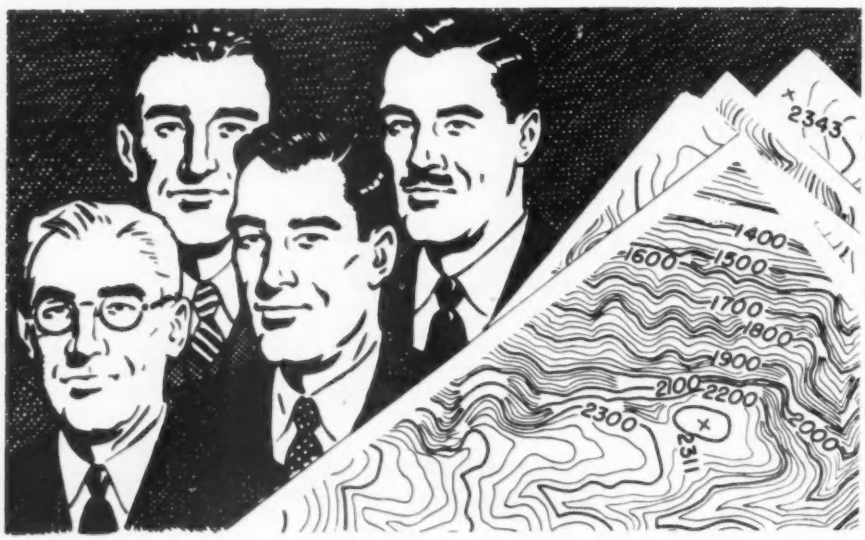
NEW MEXICO—OIL FIELD EXTENSIONS

Lea County, Dollarhide, West field. Ralph Lowe's Wowler Hair 1, in 30-24s-38e, 1-mile northwest extension, pumped 117 barrels from Drinkard lime, Permian 6546-6626 feet, completed 3-23-53, TD 6626.

Lovington, East field. Tidewater Associated Oil Co. & George H. Coates et al's H. T. Monteith 1-B, in 20-16s-37e, ⅛-mile northeast extension, flowed 481 barrels from Strawn sand. Pennsylvanian 11,298-11,330 feet, ⅜-inch 44.3-gravity, completed 3-26-53, TD 11,431.

OKLAHOMA—NEW OIL FIELDS

Kay County. Charles L. Jenkins' Hanz 1, NW NW NE 33-28n-1e, pumped 6 barrels oil and 200 barrels water from Layton sand, Pennsylvanian 2841-97 feet, TD 2897.



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McClain County. K. A. Ellison's Tankersley 1, C NE NW 25-8n-4w, flowed 125 barrels from 2nd Bromide sand, Ordovician 10,450-490 feet, 14/64-inch, 36-gravity, TD 11,308.

Noble County. D. & L. Oil Co.'s Curby 1, SW SW NE 26-24n-2w, flowed 101 barrels from Skinner sand, Pennsylvanian 4239-49 and 4255-68 feet, ¼-inch, TD 4669.

Unnamed field. T. M. Anderson's Riley E. Rush 1, SW NE SW 30-24n-2w, flowed 74 barrels from Layton sand, Pennsylvanian 3956-67 feet, 16/64-inch, TD 4982.

Seminole County. Jimmie Austin's Berry 1, SE SW NW 24-6n-5e, Old Well Worked Over, flowed 72 barrels from Earlsboro sand, Pennsylvanian 2668-71 and 2652-60 feet, 17/64-inch, TD 4047.

OKLAHOMA—NEW OIL PAYS

Garvin County, Eola field. Sohio Petroleum Co.'s Freeman 1, NE SW SE 7-1n-2w, Old Well Drilled Deeper, flowed 272 barrels from Hunton lime, Devo-Silurian 6258-90 feet, ¼-inch, 42.7-gravity, TD 6814.

Noble County, Orlando, North field. Newt Barrett, Grady Musgrave & Midwest Oil's Steiner 1, SE SW SW 19-20n-1w, flowed 75 barrels from Skinner sand, Pennsylvanian 4737-48 feet, 14/64-inch, TD 5035.

Osage County, Naval Reserve, Northwest field. Kewanee Oil Co. & Glenn Gillespie's Osage 1, SE SE SE 29-25n-7e, pumped 17 barrels from Skinner sand, Pennsylvanian 2553-60 feet, TD 2827.

OKLAHOMA—OIL FIELD EXTENSIONS

Carter County, Milroy field. Erle P. Halliburton Co.'s Million 1, SE SE SW 17-2s-3w, pumped 120 barrels oil and 8 barrels water from Pennsylvanian sand 5345-85 feet, 29-gravity, TD 7006.

Garvin County, Eola field. Max Pray's First State Bank of Elmore City 1, SW SE SE 6-1n-2w, ¾-mile north extension, flowed 160 barrels from 2nd Bromide sand, Ordovicion 10,532-728 feet, 17/64-inch, 40.8-gravity, TD 10,825.

Robberson field. G. C. Parker's Vaughn 1, SE SE SE 12-1n-3w, northeast extension, flowed 120 barrels from Bromide sand, Ordovician 8750-8862 feet, 24/64-inch, 65.4-gravity, and flowed 63 barrels from McLish sand, Ordovician 9231-9304 feet, ½-inch, 40-gravity, TD 10,024.

Okfuskee County, Micawler, Southwest field. W. B. Cleary, Inc.'s B. J. Badger 1, NE NW SW 11-13n-7e, Old Well Worked Over, west extension, pumped 18 barrels oil and 4 barrels water from Prue sand, Pennsylvanian 2621-25 feet, TD 2626.

Pontotoc County, Steedman, North field. Davidor & Davidor's Lena Adair 1, NE NE NE 14-4n-7e, east extension, pumped 50 barrels oil and 65 barrels water from Gilcrease sand, Pennsylvanian 1892-1905 feet, 28.7-gravity, TD 1982.

Stephens County, Doyle field. Trans-Tex Drilling Co.'s Hawkins 1, SW SW SW 33-2n-5w, northwest extension, pumped 68 barrels from Dornick Hills sand, Pennsylvanian 7975-8332 feet, 31-gravity, TD 9010.

OKLAHOMA—NEW GAS FIELDS

Beaver County. Carter Oil Co.'s F. W. Tretbar 1, C NW NE 7-5n-22ecm,

flowed 4.9 million from Morrow sand, Pennsylvanian 6315-30 feet, ¾-inch, and flowed 0.2 million from Chester sand, Pennsylvanian 6526-54 feet, ⅜-inch, TD 7043.

Garfield County. Olson Oil Co.'s E. N. Caudle 1, SE SE SE 27-20n-3w, flowed 0.4 million from Bartlesville sand, Pennsylvanian 5305-38 feet, TD 6062.

Grant County. Viersen & Cochran's Melcher 1, NW NE NW 18-28n-8w, flowed 2.6 million from Basal Pennsylvanian sand 4930-35 feet, TD 5678.

Okfuskee County. Barron Kidd Oil Co.'s Finks 1, NE SE SW 5-10n-10e, flowed 2.7 million from Gilcrease sand, Pennsylvanian 3014-24 and 3030-36 feet, TD 3450.

PENNSYLVANIA—GAS FIELD EXTENSION

Elk County. Driftwood field. Delta Drilling Co. et al's Sagamore Hunting Club 1, in Benezette Township, southwest extension, flowed 18.5 million from Oriskany sand, Devonian, TD 6892.

TEXAS DISTRICT 1—NEW OIL FIELDS

Frio County. Howeth & Mason's George A. Kemper 2, S. M. Moss Survey 41, pumped 40 barrels oil and 85 barrels water from Navarro sand, Upper Cretaceous 3726-41 feet, 42-gravity, completed 3-13-53, TD 3741.

Gonzales County. Producers Corporation of Nevada's P. E. Johnson 1, W. T. Williams Survey, pumped 55 barrels from Carrizo sand, Eocene 1960-2015 feet, 24-gravity, completed 2-25-53, TD 2020.

TEXAS DISTRICT 1—NEW OIL PAY

Bexar County, Lone Oak field. Rollin V. Hill, Jr.'s Irene Woods 1, Jose M. Arocha Survey 15, pumped 4 barrels from Olmos sand, Upper Cretaceous 1416-26 feet, 36-gravity, completed 3-30-53, TD 1460.

TEXAS DISTRICT 2—NEW OIL FIELD

Refugio County, Hynes Ranch field. Sam E. Wilson, Jr.'s Jamie Hynes F-2, John Malone Survey, flowed 168 barrels from Tom O'Conner (Frio) sand, Oligocene 5940-48 feet, 11/64-inch, 34.9-gravity, completed 3-17-53, TD 5990.

TEXAS DISTRICT 2—NEW OIL PAY

Live Oak County, Mt. Lucas field. Kirkwood & Morgan, Inc.'s Hallie T. Booth et al 1, M. B. Kirlin Survey, flowed 84 barrels from Upper Vicksburg sand, Oligocene 3750-54 feet, 10/64-inch, 25.4-gravity, completed 3-10-53, TD 4601.

TEXAS DISTRICT 2—NEW DISTILLATE FIELDS

Calhoun County. Humble's Matagorda Bay State Tract 73-1, in Matagorda Bay, flowed 170 barrels distillate and 8.0 million from 8570-90 feet, open, completed 2-27-53, TD 9650.

Live Oak County. Carter & Carter's J. J. Thurmond 1, W. H. Hall Survey, flowed 29 barrels oil and 32.5 million from Mackhank sand, Eocene 8322-28 feet, completed 3-8-53, TD 8603.

TEXAS DISTRICT 3—NEW OIL PAYS

Brazoria County, Damon Mound field. W. Stewart Boyle's T. L. Smith, et al 1, A. Darst League, Block 37 of T. L. Smith Subdivision, flowed 115 barrels from Frio sand, Oligocene 4430-46 feet,

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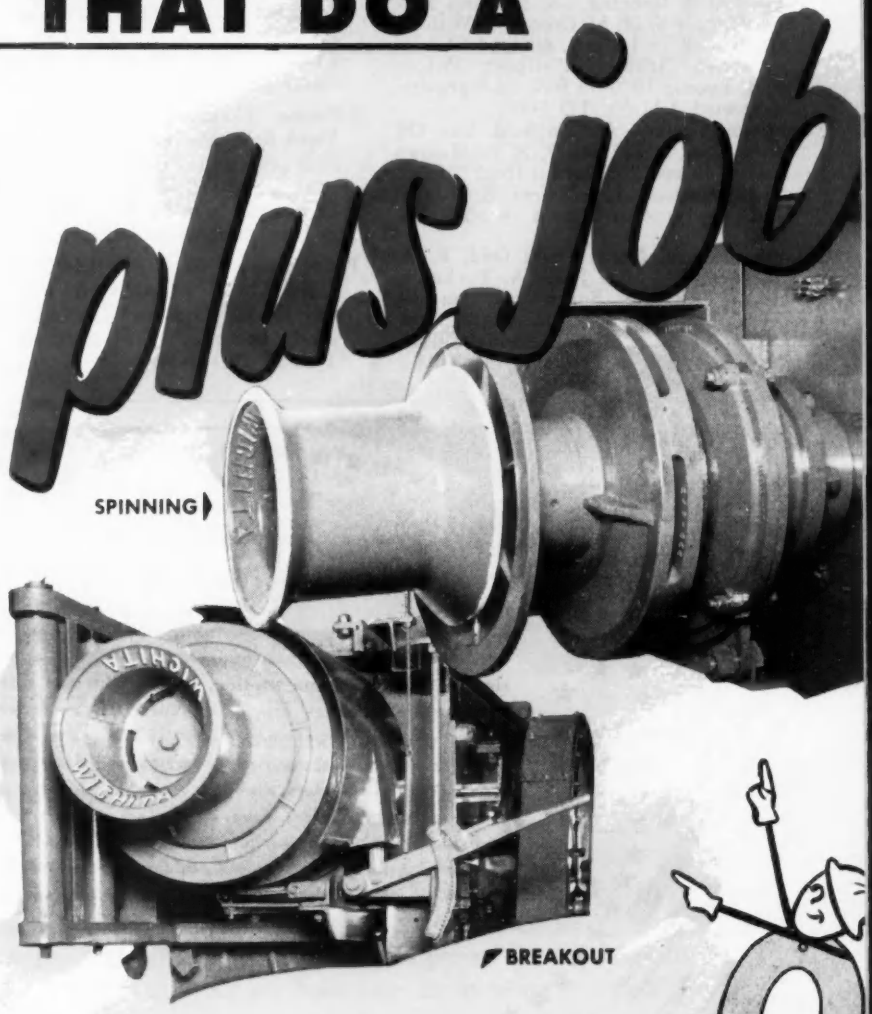

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9/64-inch, 26-gravity, completed 3-4-53, TD 4446.

Fayette County, Elm Grove field. Hamman Oil & Refining Co. & States Marine Corp.'s S. H. McCrorey 2, William Kuykendall ⅓ League, pumped 21 barrels from Arnim "A"-Upper Wilcox sand, Eocene 1930-39 feet, 21.0-gravity, completed 3-11-53, TD 2000.

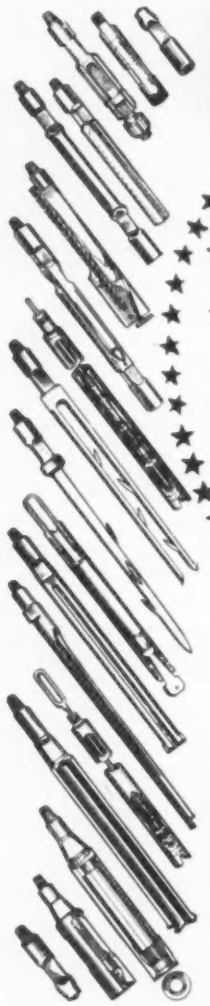
Galveston County, Caplen field. Sun Oil Co.'s Zinn & Forman 9, S. F. Hughes Survey, flowed 203 barrels from "10-X" sand, Miocene 7771-78 feet, 8/64-inch, 36.8-gravity, completed 4-1-53, TD 7850.

Harris County, North Delhi field. F. A. Callery Inc.'s Mrs. Jessie A. Tucker 2, H&TC RR Co. Survey, Section 30, Block 2, ungauged from Yegua sand, Eocene 6482-86 feet, 7/64-inch, 40.4-gravity, completed 3-25-53, TD 7401.

Jasper County, Buna, North field. American Republics Corp. & Houston Oil Co. of Texas' John D. Johnson Fee 1, John D. Johnson Survey, flowed 38 barrels from 12th Yegua sand, Eocene 7572-79 feet, 9/64-inch, 46.2-gravity, completed 3-6-53, TD 8132.

Jefferson County, Spindletop-Southwest Flank field. Michel T. Halbouty's Marrs McLean Fee 1, Pelham, Humphries Survey, flowed 128 barrels fom Frio 6 sand, Oligocene 5026-30 feet, ⅛-inch, 28.8-gravity, completed 3-18-53, TD 5316.

Polk County, Goodrich field. Currie B. Davis' C. M. Boman 4, A. Viesca Survey, flowed 128 barrels from Frio 6 sand, sand, Eocene 3368-67 feet, completed 1-13-53, TD 3448.



YOUR U. S. A.

If this nation is again to go forward in the American tradition with every man guaranteed his "inalienable rights" under the Constitution, it will take the active cooperation of every one of us. We must be forever on the alert to detect and effectively block the efforts of those who would curb our liberties and destroy the free enterprise system that has made us socially and economically the most favored nation on earth. We can cooperate by making sure that our representatives in Washington know that we are solidly behind their efforts to give to this nation a new birth of freedom.

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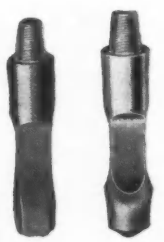
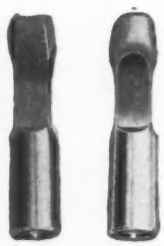
Spang also offers Boxes and Pins with scarfed ends ready for fire welding. All are supplied to the domestic trade through authorized field repair or service shops.



D330 D332



D335 D337

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TEXAS DISTRICT 3—NEW DISTILLATE PAYS

Colorado County, Cecil Noble field. C. N. Housh & American Republics Corp.'s Pearle Wooten 2, J. Haddon Survey, flowed 40 barrels distillate and 2.4 million from Wilcox "A" sand, Eocene 8368-82 feet, open, 58.0-gravity, completed 2-28-53, TD 9010.

Liberty County, Hardin field. Eddy Refining Co.'s K. V. H. Humphreys, et al 1, Franklin Hardin Survey, flowed 40 barrels distillate and 2.0 million from 8419-62 feet, 10/64-inch, 49.8-gravity, completed 2-23-53, TD 8510.

Matagorda County, Wadsworth field. Magnolia Petroleum Co.'s Hamilton Savage 1, Old Well Drilled Deeper, J. C. Peyton Survey, Lot 12, Block 8 of Subdivision, flowed 259 barrels oil and 7.3 million fom Frio sand, Oligocene 11,-246-254 feet, 14/64-inch, 49.5-gravity, completed 3-3-53, TD 12,013.

TEXAS DISTRICT 3—DISTILLATE FIELD EXTENSIONS

Colorado County, Lissie field. Fidelity Oil & Royalty Co.'s Mary Emma Hoyo 1, GH&H RR Survey, ⅔-mile northwest extension, flowed 525 barrels distillate and 21.3 million from Wilcox sand, Eocene 9588-98, 9604-22 and 9636-91 feet, open, 53-gravity, completed 3-28-53, TD 11,556.

Hardin County, Hampton, South field. American Republics Corp.-Houston Oil Co.'s Henry Binns 8, Henry Binns League, Abstract 6, ½-mile west extension, ungauged from Wilcox sand, 8182-86 feet, completed 3-10-53, TD 8500.

TEXAS DISTRICT 3—NEW GAS PAY

Brazoria County, Allen Dome-East Flank field. Continental Oil Co.'s S. S. Perry 1, J. C. & G. W. McNeel Survey, flowed 13.0 million from Miocene sand, 2448-60 feet, open, completed 2-15-53, TD 6803.

TEXAS DISTRICT 3—GAS FIELD EXTENSION

Fort Bend County, Finfrock field. Union Producing Co. et al's Roesner A-1, I&GN RR Survey, ¾-mile southwest extension, ungauged from Cook Mountain sand, Eocene 7486-96 feet, completed 3-16-53, TD 7591.

TEXAS DISTRICT 4—NEW OIL PAYS

Aransas County, Fulton Beach field. Sun's Copano State 74-6, Subdivision Copano Bay Tract 74, flowed 107 barrels from A-3 sand, Oligocene 7143-48 feet, 9/64-inch, 42.6-gravity, completed 3-28-53, TD 7190.

Lamar field. Harrell & Southworth's Mrs. J. B. Heard 1, Lamar Townsite Outlots 9 & 10 in Lamar Townsite, flowed 137 barrels from Frio (B-2) sand, Oligocene 6956-58 feet, 10/64-inch, 38.7-gravity, TD 7818.

Salt Lake field. Sun Oil Co.'s Copano State Tract 104-3, Subdivision of Copana Bay, flowed 150 barrels from Lower "H" sand, Oligocene 7752-58 feet, 9/64-inch, 42.5-gravity, completed 3-31-53, TD 9102.

Hidalgo County, Donna field. Fitzpatrick Drilling Co.'s Krenmueller Estate 1-A, Alamo Land & Sugar Co. Subdivision, Section 12, Block 11, flowed 117 barrels fom Rio Bravo sand, Oligocene 6061-69 feet, 7/32-inch, 47.8-gravity, completed 3-8-53, TD 7007.

Tabasco-Segment 3 field. Houston Oil Co. & American Republics Corp.'s Temple

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There is an axiom that can be applied to mud pump performance that's just as true as the fact that water runs down hill: mud pump performance can be no better than the INDIVIDUAL performance of the five most vital parts in the pump.

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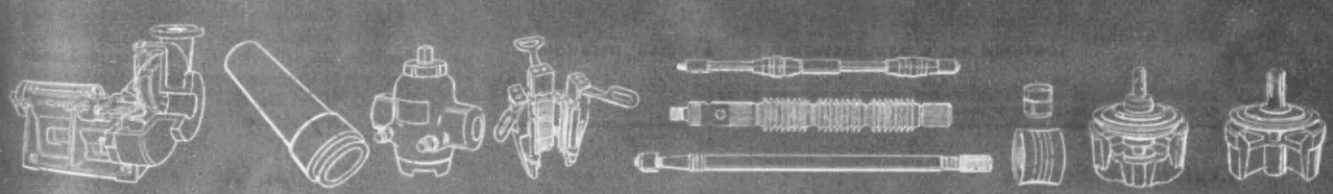

W. West et al 9, Porcion 74, flowed 162 barrels from "F" sand, Oligocene 5045-51 feet, 9/64-inch, 45.3-gravity, completed 3-22-53, TD 7506.

Starr County, Sun field. Sun's George H. Speer-State 17, G. W. Speer Survey 236, flowed 107 barrels from Vicksburg sand, Oligocene 5826-30 feet, ⅛-inch, 44.3-gravity, completed 3-5-53, TD 6996.

TEXAS DISTRICT 4—NEW DISTILLATE FIELD

Kenedy County. Sun's Laguna State 233-1-A, Subdivision Laguna Madre Tract 233, flowed 100 barrels distillate and 20.5 million from Marginulina sand, Oligocene 7294-7314 feet, open, 48.2-gravity, completed 3-13-53, TD 7350.

TEXAS DISTRICT 4—DISTILLATE FIELD EXTENSION

Hidalgo County, La Blanca field. La Gloria Corp.'s La Blanca Gas Unit 2-2, La Blanca Tract of Tracts of La Blanca & Llano Grande Grants, Section 188, Block 569, ¾-mile northeast extension, flowed 34 barrels distillate and 5.7 million from Lower Frio sand, Oligocene 7724-28 feet, open, 52-gravity, and flowed 30 barrels distillate and 5.0 million from Lower Frio sand, Oligocene 8195-8224 feet, completed 2-17-53, TD 10,315.

TEXAS DISTRICT 4—NEW GAS FIELDS

Hildalgo County. Sun's J. C. Kelly 1, Porcion 66, flowed 21.5 million from Kelly sand, Oligocene 6336-52 feet, open, completed 3-20-53, TD 8001.

Kenedy County. Sun's Laguna State 228-2-A, Subdivision of Laguna Madre State Tract 228, flowed 17.5 million from Marginulina sand, Oligocene 7236-57 feet, open, completed 3-30-53, TD 7336.

Nueces County. The Atlantic Refining Co.'s State Tract 63-1, Corpus Christi Bay, flowed 30.0 million from 6284-89 feet, open, completed 3-31-53, TD 8505.

TEXAS DISTRICT 5—NEW OIL FIELD

Freestone County, Reiter field. Bradley & Sherar's Mrs. R. V. Bounds 1, in W. T. Richie Survey, flowed 22 barrels from Nacatoch sand, Upper Cretaceous 954-979 feet, ½-inch, 24-gravity, completed 3-19-53, TD 979.

TEXAS DISTRICT 5—NEW OIL PAY

Limestone County, Wortham field. Cities Service Oil Co.'s Bounds 1, Sarah McAnulty Survey, flowed 41 barrels distillate and 13.0 million fom Woodbine sand, Upper Cretaceous 4217-36 feet, open, completed 3-3-53, TD 5954.

TEXAS DISTRICT 5—NEW GAS FIELD

Robertson County. Union Producing Co.'s Gibson 1, George Robertson Survey, flowed 5.6 million from Glen Rose sand, Lower Cretaceous 6140-61 feet, open, completed 3-9-53, TD 8053.

TEXAS DISTRICT 6—NEW OIL PAYS

Harrison County, Waskom field. Hollandsworth Oil Co.'s W. B. Taylor 1, J. M. Britt Survey, flowed 97 barrels fom Pettit lime, Lower Cretaceous 5930-40 feet, ¼-inch, completed 3-4-53, TD 6250.

Nacogdoches County, Trawick field. Humble's L. B. Barnhart 2, Joseph Weeks Survey, flowed 210 barrels oil and 31 barrels water from Rodessa lime, Lower Cretaceous 6850-80 feet, ⅜-inch, 37.4-gravity, completed 3-4-53, TD 8140.

TEXAS DISTRICT 7-C—NEW OIL FIELDS

Crockett County. Texas Gulf Producing Co.'s University of Texas "J" 1, Section 4, Block 50, University Lands Survey, flowed 7 barrels fom San Andres lime, Permian 2236-2500 feet, ¼-inch, 30.4-gravity, completed 3-17-53, TD 2500.

Runnels County, Inca-Cole field. Inca Drilling Co.'s W. H. Cole "B" 2, Old Well Worked Over, Thomas J. Hardeman Survey 267, flowed 396 barrels from Morris sand, Pennsylvanian 3703-06 feet, 12/64-inch, 39-gravity, completed 3-14-53, TD 4214.

TEXAS DISTRICT 7-C—NEW OIL PAY

Runnels County, Jim Burt field. E. K. & E. M. Burt & West Central Drilling Co.'s Robert Spill 1-B, J. C. McKean Survey 534, pumped 87 barrels from King sand, Pennsylvanian 2343-50 feet, 40.6-gravity, completed 3-12-53, TD 2350.

TEXAS DISTRICT 7-C—OIL FIELD EXTENSION

Crockett County, Elkhorn field. Texas Gulf Producing Co.'s University "K" 1, Section 28, Block 46, University Lands Survey, ½-mile northeast extension, flowed 434 barrels from Ellenburger lime, Ordovician 7271-7331 feet, ½-

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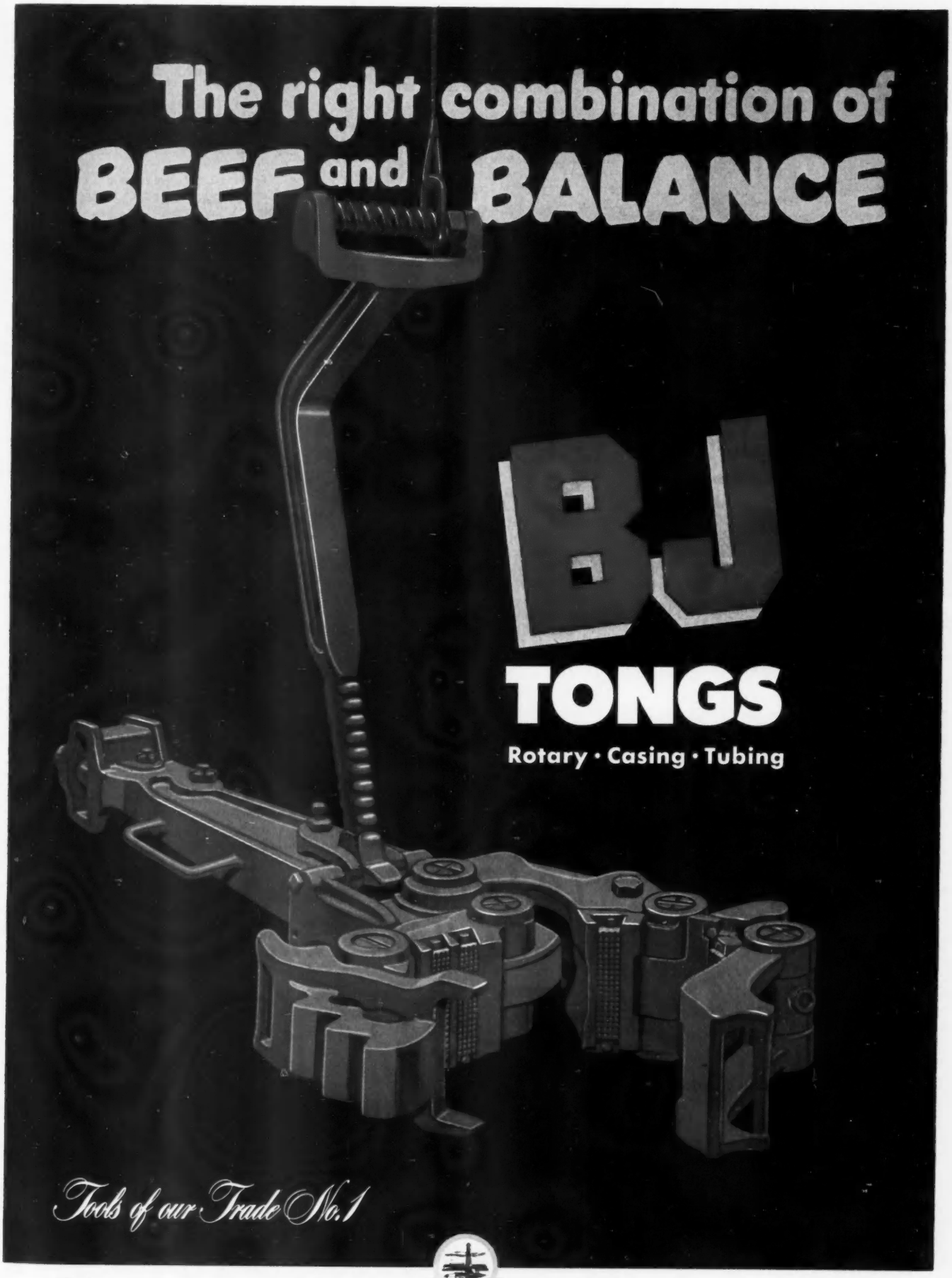

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Rainbo Service Co. - ME 4-2131, ME 4-4555
WICHITA FALLS
Hudson-Eads, Inc. - 2-3767, 2-8584, 3-4690

inch, 43-gravity, completed 3-24-53, TD 7335.

TEXAS DISTRICT 7-C—NEW DISTILLATE FIELD

Schleicher County. Carter & Carter's J. F. Webster 2, Block 1-A, GC&SF Survey, flowed 74 barrels distillate and 9.2 million from Ellenburger lime, Ordovician 4618-44, 4700-30 and 4774-86 feet, open, 50-gravity, completed 3-6-53, TD 4825.

TEXAS DISTRICT 8—NEW OIL FIELDS

Andrews County. Magnolia Petroleum Co's Fasken "BA" 1, Section 21, Block 40, T2N, T&P Survey, flowed 114 barrels from Fusselman lime, Silurian, 12,818-829 feet, 14/64-inch, 49.9-gravity, completed 3-3-53, TD 13,560.

Borden County. Rowan Drilling Company's L. I. Long 1, Section 37, Block 30, T4N, T&P Survey, flowed 80 barrels from Mississippi lime, Mississippian 8502-41 feet, 9/64-inch, 44-gravity, completed 2-21-53, TD 8606.

Dickens County. Pacific Western Oil Co.'s George F. Smith 1, Section 162, Block 1, H&GN Survey, pumped 113 barrels oil and 15 barrels water from Tannehill sand, Permian 4414-24 feet, 2-inch, 36-gravity, completed 3-5-53, TD 4535.

Mitchell County. Sun's McCabe 1, Section 225, Block 1-A, H&TC Survey, flowed 265 barrels from Strawn sand, Pennsylvanian 5928-46 feet, ¼-inch, 45.2-gravity, completed 3-7-53, TD 6866.

Pecos County. G. D. Putnam & Co.'s Hart et al 1, Section 31, Block 11, H&GN Survey, flowed 264 barrels from Clearfork lime, Permian 2415-49 and 2595-2601 feet, ⅜-inch, 34.6-gravity, completed 2-14-53, TD 4753.

TEXAS DISTRICT 8—NEW OIL PAY

Gaines County, Florey field. Anderson-Prichard Oil Corp. & Forest Oil Corp.'s Parmer County 2-A, Labour 21, League 317, Parmer CSL Survey, pumped 5 barrels oil and 11 barrels water from San Andres lime, Permian 5150-5202 feet, 26.4-gravity, completed 3-10-53, TD 12,805.

TEXAS DISTRICT 8—OIL FIELD EXTENSIONS

Ward County. Continental's F. M. Scott "31" 1, Water Tract #5, Section 31, Block 33, H&TC Survey, 1-mile southeast extension, flowed 251 barrels from Delaware sand, Permian 4984-4990 and 5006-15 feet, 12/64-inch, 38.7-gravity, completed 3-4-53, TD 5721.

Yoakum County, Brahaney field. W. E. Dunigan, Jr.'s N. E. Dupree et al 1, Section 424, Block D, John H. Gibson Survey, ¾-mile northwest extension, pumped 12 barrels oil and 45 barrels water from San Andres lime, Permian 5330-67 feet, 33-gravity, completed 3-14-53, TD 5367.

UTAH—NEW GAS FIELD

Uintah County. Carter Oil Co.'s Gloria Bamberger 1, SW NE 7-7s-24e, flowed 3.4 million from Green River lime, Eocene 5318-23 feet, 1-inch, completed 3-1-53, TD 5730.

WYOMING—NEW OIL FIELDS

Converse County. Far West Oil Co.-Hancock Oil Co.'s V. R. Ranch A-1, SE SE 26-33n-76w, pumped 20 barrels from Muddy sand, Upper Cretaceous 6205-08 and Dakota sand, Lower Cretaceous 6394-98 feet, 33-gravity, completed 3-13-53, TD 6417.

Crook County, Donkey Creek area. True & Brown's Stevenson 1, NE SW 5-49n-68w, pumped 35 barrels oil and 15 barrels water from Dakota sand, Lower Cretaceous 6236-52 feet, 42-gravity, completed 3-28-53, TD 6301.

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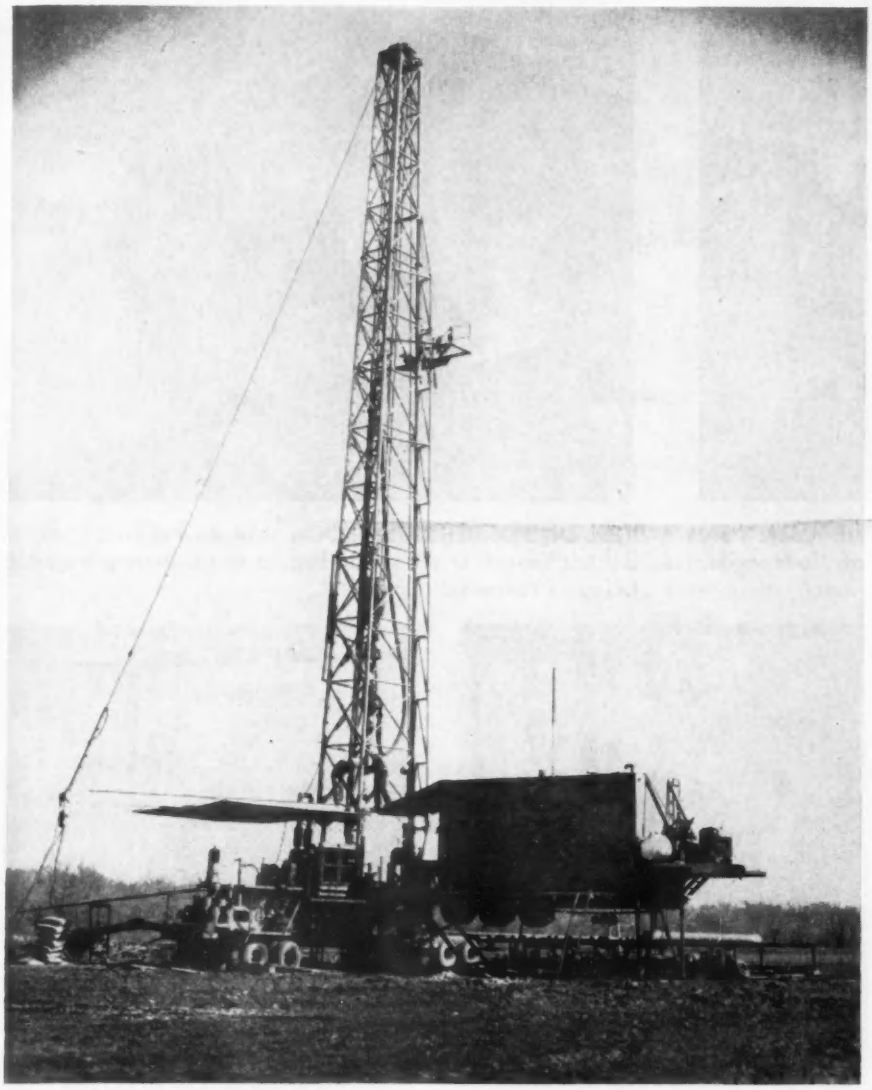


This is one of the most unusual and compact rigs in the 6000-foot class. Here it's ready for drilling. Doghouse trailer has been raised to level of derrick floor. Derrick has been raised. Mud pump has been connected. All this in a few hours.

Safety, efficiency and ruggedness were their aims . . . and the result was . . .

The Rig With 100 Hints

By DUDLEY MADOLE, Drilling Superintendent
Crow Drilling Company, Shreveport, La.

CONVENTIONAL RIG design went out the window when David Crow, president of Crow Drilling Company, and Mechanical Engineer Clifford Williams sat down with pencils in hand to design the rig with a hundred hints. Regardless of past or present practices, they assumed that a better drilling rig could be built.

Safety, efficiency and ruggedness were their aims. They came up with a highly flexible rig by minimizing the number of working parts. This reduced the rig to the simplest form necessary for customary usage. Then they further improved the design.

Claimed to be more portable for fast drilling than anything in the 6000-foot class, the rig has proved to be a profit-maker. Portability of the rig is proven by the fact that only three legal loads are required at location to begin drilling.

The three loads are:

1. Drawworks, motor, mud pump and rotary—weighing 50,600 pounds.
2. Derrick hook, swivel, crown, block, wire line pipe racking box and walkway—weighing 39,500 pounds.
3. Doghouse, diesel tank, butane tank, light plant, water tank and lubricating storage—weighing 42,500 pounds.

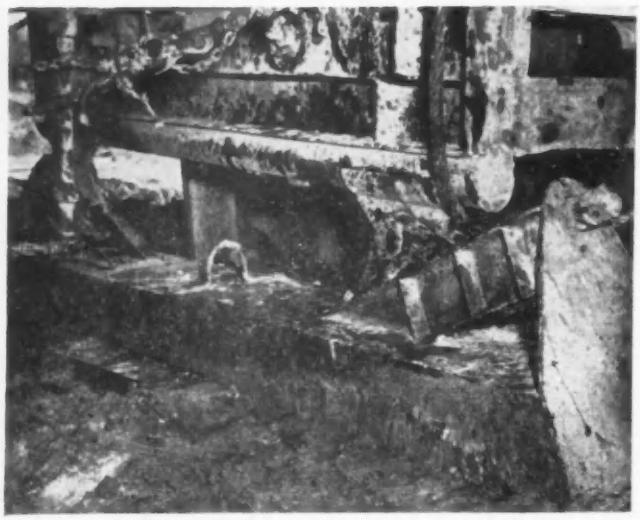
Additional loads such as drill pipe, blowout preventers, auxiliary light plant, etc., depend on depth of the well and company requirements.

Each load complies with state highway laws regulating overwidth overlength and overweight requirements. All loads may be lightened with minimum effort, because the rig was designed to allow rapid teardown of the rotary table, pump or the motor from the drawworks. Tandem axles were installed permanently under each piece of equipment comprising the drawworks, derrick and dog house. This allowed each load to be within legal requirements for height, and also lowered the gross weight of each load on the road about 8000 pounds.

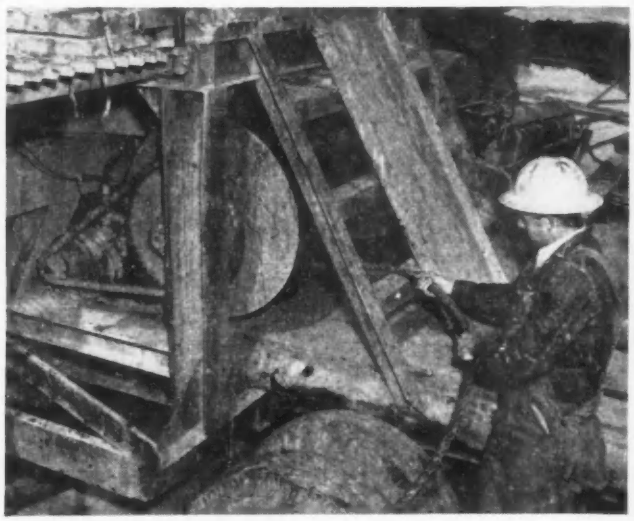
Considering that this was not patterned for a super core drill unit but a full-scale drilling rig, acceptable to oil operators for contract drilling, the designers have reached their objective.

The first rig was finished and moved to Farmington, N. M., in June of 1952 to drill Picture Cliff formation wells in the San Juan Basin. Up to this writing, this rig has drilled more than 30 wells from 1400 feet to 3100 feet. On the third moving job, the rig was torn down on location, moved about a mile, rigged up and started drilling, all within seven hours and at night.

Twin six-cylinder diesel engines, rated at 420 brake horsepower with torque converter, drive the drawworks, a 12-inch oil bath rotary and



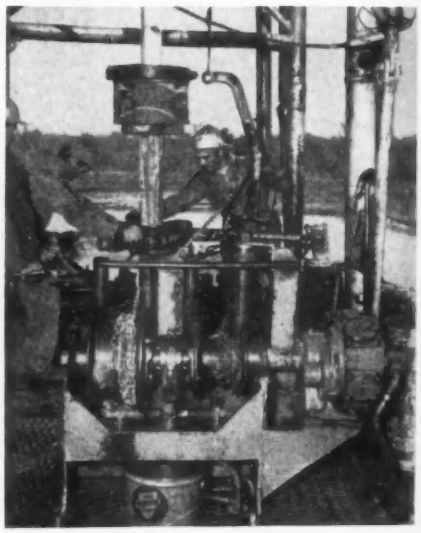
DERRICK SUPPORT is provided by this foundation. Large screws such as the one at the right allow independent vertical adjustment for leveling.



REEL UNDER DERRICK FLOOR is chain-driven by reversible air motor. It reels wire line in or out when derrick is being extended or telescoped.

BRAKE FLANGE outside main drum bearing can be changed by removing six bolts and not the complete drum shaft assembly. Co-designer David Crow inspects flange mechanism.

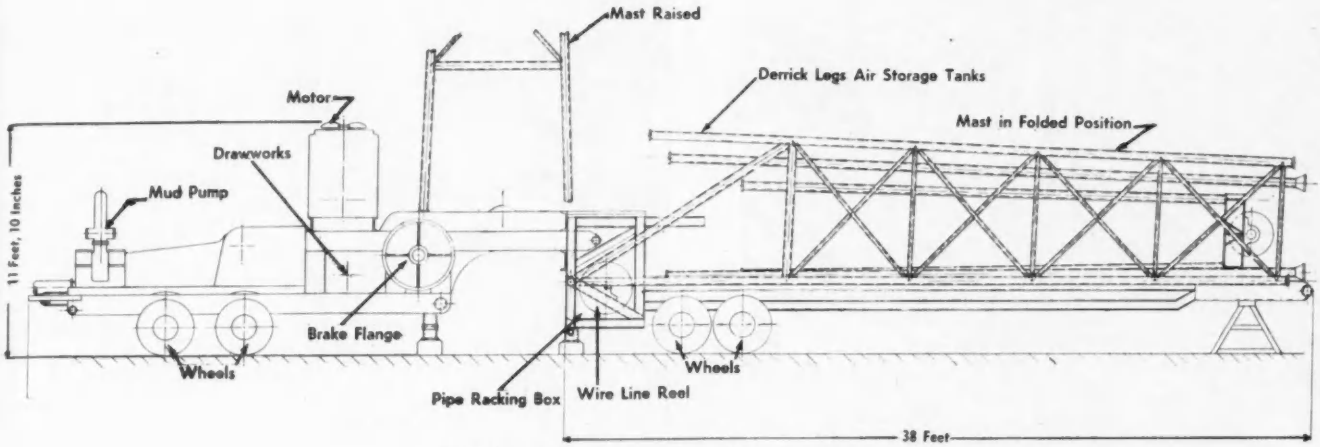
MEASURING DEVICE for wire line is mounted on bracket on derrick leg and driven by V-belt from diesel generator drive at the rear. Note the air host at right.



CATWORKS is mounted to the right of the driller's position. Safety and flexibility are features of the air-spinner-driven breakout catworks used here.

DRAWWORKS TRAILER loaded and ready to be moved to new location.

RADIO-TELEPHONE conveniently located inside the doghouse. Catworks is in the background.



Artist's sketch of drawworks and derrick trailer.

a 175-hp mud pump. The drawworks has three speeds on the drum and four speeds on the rotary.

The rig is equipped with only one brake flange. The flange has never been changed but due to the unique design of the flange outside the main drum bearings, it can be changed by removing six bolts. This is said to be an improvement over conventional rig design and eliminates the long process of removing the complete drum shaft assembly from drawworks to change the brake flanges. One flange eliminates equalizer linkage repair. The brake handle has an air drum setting that eliminates the addition of weights on the handle. With this, plus the patented cam compounding brake arrangement, better "drilling and coring feed off" can be set.

The 15-inch double hydromatic brake is mounted under the drawworks motor and is accessible, yet hidden from sight. It is placed as low as possible so as to receive water pressure from the water tank inlet atop the doghouse, thereby eliminating a special pump. Also, it is driven directly by the "backup" of the low drum drive chain, thereby eliminating one chain, two sprockets and a set of bearings.

Chains. Except for the rotary chain, 2-inch high-velocity chains are used throughout the rig. Without this newly designed chain, the legal roadway of eight feet would not have been possible and the hydromatic drive could not have been so simple. This chain permits increased drive speeds, consequently more horsepower output from less expensive, smaller engines. The contractor has found this chain to be very satisfactory up to this time. Not only is the exceptionally narrow width advisable, but the chain is unusually noise free.

The pump suction strainer hint of having a screen is not unusual. However, the contractor has gone a step further and made the screen connection the same as the suction pipe. With this, the suction pipe can be used on either side of the pump and the screen used on the other side. The only equipment necessary is a sledge hammer. Invasion pipe, made of a very light metal, was used to fabricate the mud jet.

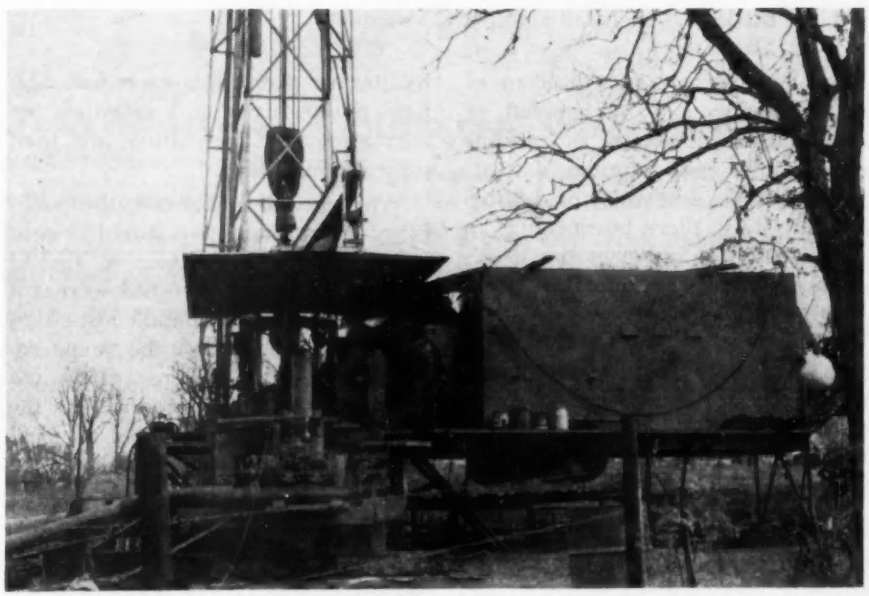
Air hoists have been used on Crow Drilling Company's rig for the past four years, effectively reducing the accident rate caused by catheads. The members of the drilling crews are greatly pleased with the equipment.

The air spinner and the breakout "catworks" are novelties, but useful pieces of equipment. The air "catworks" is a proper medium speed machine that offers the flexibility of a steam engine. In the last four years, not one accident has been reported due to the air hoist or air driven catworks.

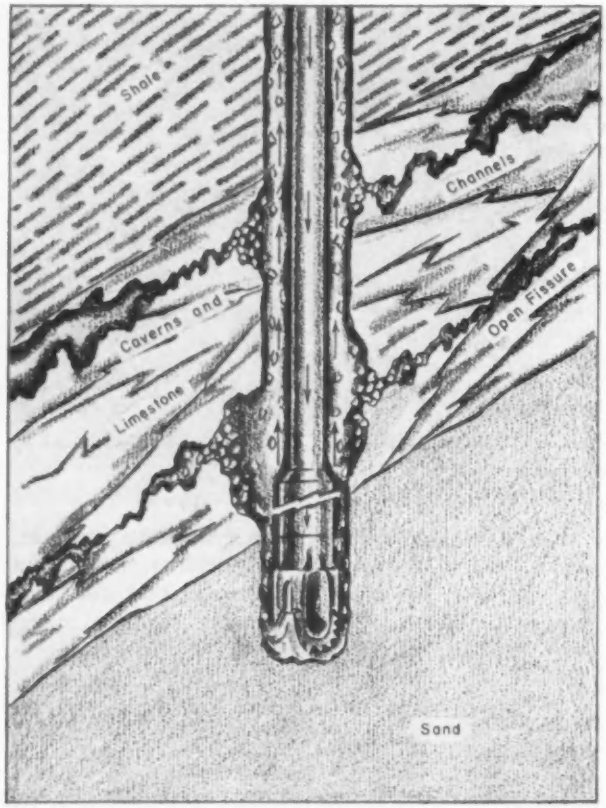
An interesting innovation is the way the derrick legs are used for air volume tanks for the air compressers. The derrick does not require guy wires but reinforcement braces are on the outside of the derrick and are designed to fold inward so as to make the load within the eight feet required by law.

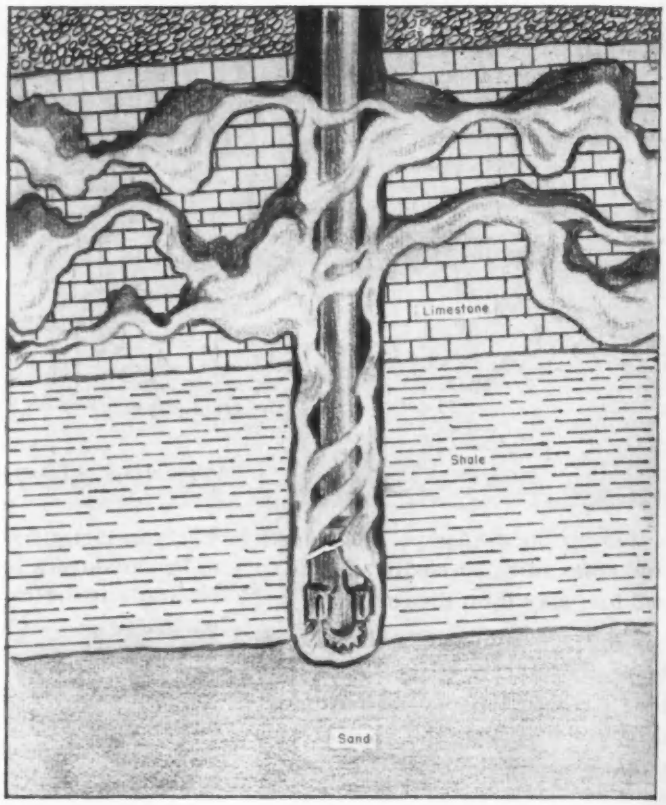
The walkway and pipe racking box are built together as one unit with wheels mounted under the pipe racking box The 96-foot telescoping derrick is permanently pinned to pipe

■ CONTINUED ON PAGE 158



Closeup view of doghouse trailer.





The exact type of lost zone rarely is known with certainty. But the worse losses must be either to the cavernous and channel or to the open fissure type. The treatment to be applied must be selected to the condition pictured at left. After the bridge forms normal circulation ensues. Neat cement could hardly be effective under conditions shown at right. Gel cement, oil bentonite or time setting clays are preferred for the loss illustrated here.

Lost Circulation Can Be Avoided or Minimized

A study of possible losses and planning of treatment in advance of drilling helps ease this major problem in exploration and development.

By J. M. BUGBEE, Shell Oil Company, Houston

THE MAJOR DRILLING problem of lost circulation can be avoided or minimized by the study of possible losses and the programming of treating procedures in advance of drilling. Not only must there be openings in the formation of sufficient size to accept and store the lost mud, but excessive pressures must act to force it away. Careful study of the nature of loss zones, their formation-fluid pressures and the hydrostatic and mechanical pressures that can be imposed should be made.

The hypothesis is presented that many serious losses are due to naturally-occurring fractures which are normally impermeable but which open and accept whole mud when a critical hydrostatic pressure is exceeded. The field procedures and materials for combating lost circulation are then critically examined.

When a well is planned, the possibility of lost circulation should be considered and the behavior of similar wells in the vicinity studied so that a program to properly handle lost-circulation occurrences can be prepared. Important considerations are the use of the minimum safe mud weight, the handling of the rig to avoid all pressure surges, the taking of full advantage of waiting periods, the proper choice of treatments, and, finally the change from one type of treatment to another as indicated by results in the well.

Part 1

Lost circulation is, of course, a problem as old as rotary drilling. In the interior U. S. and Canada it is the major factor in most high drilling-cost wells. Where the average well may have a mud cost of $4000, the lost-circulation well will have one of $8000 to $50,000. To the cost of lost mud materials must be added that of the rig time consumed and the cost of the occasionally accompanying stuck drill pipe, lost hole, blowout or abandonment. There are also cases of missed production chargeable to lost circulation, from failure to secure production tests and samples; and of de-

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creasd productivity from the plugging of productive zones. The problem is presently highlighted by the search for production from fracture reservoirs, i.e., from lost-circulation zones.

Lost circulation as a problem has not received the consideration it merits because its study has fallen between the fields of geological, reservoir, and drilling engineering. The literature, therefore, until very recently[1] has not contained a well-reasoned, general discussion of the subject. The past three years have, however, seen what can be called an industry-wide attack develop on the problem.

The purpose here is to review and extend the thinking that is being carried on and to recommend the institution of certain procedures that are helpful with lost-circulation problems.

Causes of Lost Circulation. Lost circulation is defined as the loss of whole mud, in quantity, to exposed formations. This plainly requires the presence of permeable zones with openings of sufficient size to permit the entrance and storage of lost mud. Consideration indicates that another equally important factor is that a certain hydrostatic pressure must be exceeded before the formations will accept the lost mud. Knowledge of the type of loss zone, its formation-fluid pressure, and the hydrostatic and mechanical pressures to be imposed are essential to consideration of the problem.

Seepage losses of mud are not included in the foregoing. In many parts of the interior U. S., particularly in West Texas, low-solids muds, even dirty water, having very poor wall-building properties are used to considerable depths. The seepage loss of such muds to permeable beds can amount to several barrels per hour. The addition to the circulating fluid of such materials as flake mica, leather fiber, and cellophane fragments can effectively reduce these losses.

Procedures for Lost Circulation. The available procedures for dealing with lost circulation can be summarized as follows:

- Avoidance or correction by the correction of drilling practices or mud properties. A long list of procedures and considerations can be made, but all are directed at lowering the pressures on the formations.
- Adoption of a drilling method such as drilling blind, with or without a floating mud cap; drilling under pressure with the well flowing; or drilling with air.
- Correction by use of waiting periods—the pulling of the drill pipe into the casing and allowing the well to stand while the formations, or the formation blocks, adjust themselves to withstand the new pressure conditions.
- Placement of a soft plug, batches of mud thickened with fiber and flake materials, in the lost zone. There is a decided trend away from circulating these materials and to the practice of spotting them in batches as plugs.
- Placement of a bridging-particle plug, batches of mud loaded with gravel, expanded perlite, ground plastic, walnut shells, or formation cuttings, in the loss zone. If possible, some squeeze pressure is applied. This can sometimes be accomplished by blind drilling where the cuttings are carried into and bridge in the loss zone.
- Placement of a plug that hardens or stiffens in the loss zone. Such plugs include gel, cement, gypsum cement, oil-base mud, oil-bentonite, and time-setting clay. All may have admixtures of thickeners or bridging particles. If possible, moderate squeeze pressure is applied to the plug.

As a broad statement, it can be said that watering back to lower the mud weight is the universal treatment for lost circulation.

Discussion of Causes This section includes discussions of the formations that can take whole mud, their formation-fluid pressures, and the hydrostatic and mechanical pressures that are or can be imposed on them.

FORMATIONS. The formation types which can take whole mud can be summarized under three headings: 1. Cavernous and open-fissured formations. 2. Coarsely permeable formations. 3. Faulted, jointed and fissured formations. Cavernous and vugular beds, reefs, gravels and other coarsely permeable formations are generally single sedimentary units and the geologic correlations of circulation losses in wells to such zones within a field, or even within a province, should be quite exact. Old, weathered surfaces, such as that of the Devonian in the northern Canadian plains, also provide correlatable loss zones. Faulted and fissured zones are, however, structural in origin and can extend across several stratigraphic units. In those fields where the loss zones in wells have no pattern and are scattered both areally and in section, mud loss to fissures can be assumed.

A range of formation permeabilities exists from those at one extreme, with formation openings large enough to be practically unpluggable, to the other extreme where the formation face can be readily sealed with a cake of mud and fiber and flake lost-circulation material. The nature of a loss zone is rarely known with certainty, but study of lost-circulation occurrences in an area can narrow the range of possibilities.

COARSELY PERMEABLE FORMATIONS. The order-of-magnitude permeability of a granular formation of sufficient permeability to accept whole mud can be calculated. An appreciable portion of the solids present in natural muds have diameters of 70 microns or larger. A formation with openings which would permit such muds to pass would likely have pore diameters three times greater than the mud-particle size, or 210 microns. It can be shown that the average pore diameter, d, in microns, is related to the permeability, k, in darcys, and porosity, f, in fractional percent (percent/100) by the following equation:

$$d = 5.63\, l/l_e \sqrt{k/f}$$

wherein: l is the distance a fluid moves in traversing a length, l_e, of the porous medium. The ratio l/l_e is always greater than unity and, in general, approaches one as permeability increases and grain size becomes more uniform. For the present calculation, the value of 1.3 for this ratio can be used. If a 40-percent porosity is assumed for a rock with 210-micron diameter pore openings, the limiting permeability is found to be 325 darcys. Muds generally have an appreciable sand and fine-cuttings content and such particles will bridge on a coarser, more permeable formation than this. It is recalled that extremely few formation-permeability values are as great as three darcys.

The circulation of the conventional fiber and flake lost-circulation materials as a treatment very frequently gives disappointing or no results. One answer is that gravels and similar coarsely permeable loss zones are rare in the subsurface and that serious losses are generally to formations with openings of relatively large size.

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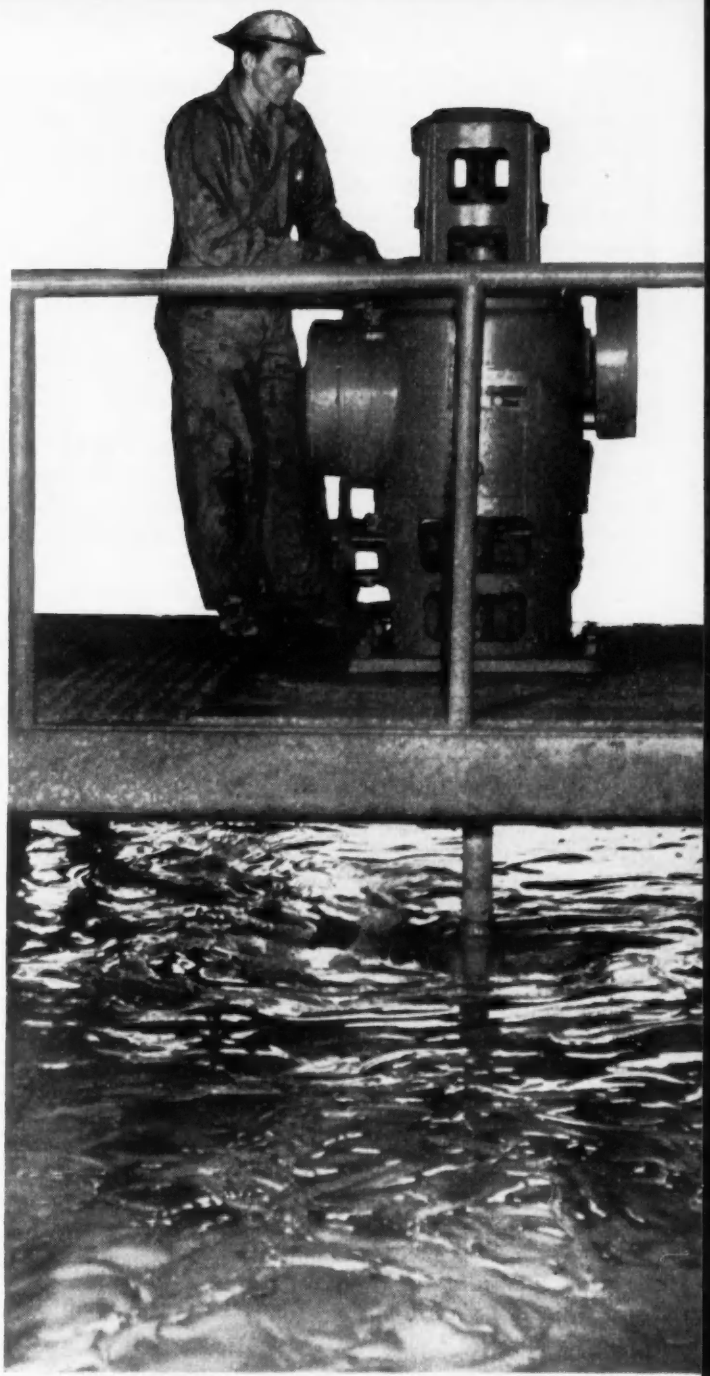

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wells in which lost circulation is experienced, where no cavernous or coarsely permeable formations are exposed in the open hole and the losses are, plainly, to fissures. Fissure systems occur in all formations—sands, shales, limes, dolomites—and are not generally confined to single beds but can extend across several. Spinner and other surveys have established, in the Gulf Coast, that losses to fissured shales are as frequent as losses to fissured sands. Fissure systems are structural in origin rather than sedimentary. Fields are known where fissure loss zones are related to axial faulting and flank wells have little trouble; but, in general, correlation with known faulting is not evident.

The author's consideration of lost circulation and the related phenomena of pressure fracturing, squeeze cementing, and pressure break-through in water-flooding has suggested the hypothesis[2, 3] that the crust of the earth in many fields and prospects is faulted, jointed, and fissured; and that such fissures are impermeable (will not take mud) at certain pressures, but will open and take whole mud, i.e., the formation blocks will shift slightly when a critical hydrostatic pressure is exceeded. For the present subject, the question can be considered academic whether the fissures occur naturally or are actual ruptures induced by increases in hydrostatic pressures. This, however, can be important and the growing literature on pressure fracturing should be reviewed; see, for example, references 4 and 5.

The question is often asked about losses to non-cavernous formations, "Where does the mud go?" A linear fissure ⅛ inch in width and with a circular area of 1 acre centering about a well has a volume of 81 barrels and the radius is only 118 feet.

Losses to fissures vary greatly in occurrence. Sometimes a half pit (50-150 barrels) of mud is lost rather suddenly, but drilling can continue with no further loss. In Gulf Coast wells, using high gel-strength muds, losses of mud to formation have been noted as circulation was started after trips. After two or three circulations which reduced pressure on the formation by breaking the gel of the mud, the lost mud had returned to the system. Such squeeze losses are not uncommon. There are many fields where loss of circulation with a 9.7 pound per gallon (72.5 pounds per cubic foot) mud is complete but where, if a 9.5 pounds per gallon (71 pounds per cubic foot) mud is used, a well can be drilled as if the lost-circulation problem did not exist. Some fissure systems can be sealed by one or a series of lost-circulation plugs; others are best handled by a special drilling method.

Shallow Losses. In many fields circulation losses are discussed in two groups, viz., shallow and deeper losses. In most discussions of shallow losses, they are attributed to the unconsolidated nature of the near-surface formations. The author believes that "uncemented" is a better descriptive term because ordinary sands are never unconsolidated, inasmuch as the normal deposition of sand grains results in an assemblage that is practically in its final state with insignificant later compaction effects. Further, "unconsolidated" is an unsuitable descriptive for clays and shales. It appears, however, that there is a valid point here and that is that near-surface formations are generally checked and jointed and lost circulation can be incurred with only slightly excessive pressures. Frequently, when the shallow formations are broken down, i.e., the joints and fissures are opened, the losses are extreme enough so that the largest concentrations of lost-circulation materials will not plug them and recourse is made to such a plug as oil-bentonite. In general, these losses can be avoided by watering the mud to hold low weight, and by the control of drilling practices to prevent balling-up or packing-off of the drill stem to apply the full pump pressure to the formations. The shallow formations are drilled in big hole with generally high drilling rates, and the mud velocities in the annulus are low. It is possible to pack off the bit in a soft formation because the circulation does not properly clear the cuttings. In fields where these losses occur, a warning regarding them should be posted on the bulletin board of drilling wells.

An example of this type of loss is recalled in the North Port Neches field, of the upper Texas Gulf Coast. The contractor's water well went off production, but the drilling crew did not suspend drilling and drilled ahead in uncemented sands. The mud weight built up rapidly, the last measurement was 11.8 pounds per gallon (88 pounds per cubic foot), and returns were lost. Something over 24 hours rig time and about $1000 worth of purchased clays were required to regain circulation in this unnecessary occurrence.

Formation-Fluid Pressures. Reservoir engineers, geologists working with problems of migration and accumulation of oil, and drilling engineers find that charts showing depths from surface to oil-water contract vs. initial reservoir pressure (pounds per square inch gauge) for various geological provinces or areas are of great interest. (Figure 1, Reference 6.) Not enough such displays of regional formation-fluid pressure gradients are available. Frequently, such charts show only the subsea depths and pressures; and they are, of course, an abstraction to the drilling engineer who works with the pressure from the surface, both for formation-fluid and hydrostatic pressures.

A normal-pressure reservoir is defined as one with a pressure, measured or calculated at the oil-water or gas-water interface, which is equal to the pressure of a water column to the surface. Most Gulf Coast reservoirs are under a normal salt-water column pressure and have a depth-pressure gradient of 0.465 pounds per square inch per foot. Many West Texas fields and those in the foothills belt of Canada are also generally normal. It is also known that the Spraberry fields of West Texas, many Mid-Continent fields and those of the Canadian plains have subnormal pressures with gradients ranging from 0.24 to 0.38 psi per foot of depth. On a world-wide basis, abnormally high formation-fluid pressures are very uncommon.

Generally, when the fluid level is not at the surface the drilling crew will record the fluid level whenever drill pipe is pulled by noting the wetting level on the drill pipe. This will not always be accurate and can be confusing. Running through the drill pipe of a float or short piece of spinning chain attached to the measuring line will accurately locate a fluid level.

Hydrostatic Pressures. In a very broad way, the commonly used muds have densities ranging between 9.5 and 10.5 pounds per gallon (71 to 78.5 pounds per cubic foot) with pressure gradients from 0.494 to 0.546 psi per

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foot of depth. Clay-water muds are three-part systems having gel and inert fractions and the fluid phase. Generally, the balance between these fractions is most easily maintained in the 9.5-10.5 pounds per gallon weight range. Muds of lesser weight need attention to maintain a fair gel fraction with constant watering, and muds above 10.5 pounds per gallon need attention because of the high solids-to-water ratio.

A normal-pressure sand at 10,000 feet in the Gulf Coast will have a pressure of about 4650 psi. If a low-gel mud is in use and there are sufficient drilling clearances, e.g., 4½-inch drill pipe in 9⅞-inch hole, an over-balance of 300 to 400 psi is adequate. Thus, a 9.7 pounds per gallon (72.5 pounds per cubic foot) mud can be safely used. If there is no lost-circulation problem, however, the mud weight will be allowed to range between 10 and 10.5 pounds per gallon (75-78.5 pounds per cubic foot). In southern Oklahoma, some reservoirs have pressures with a subnormal gradient of approximately 0.37 psi per foot. Thus, to use approximate round numbers, the reservoir pressure is 3700 psi at 10,000 feet. The commonly used mud weighs 9.5 pounds per gallon (71 pounds per cubic foot); its pressure is 4940 psi at 10,000 feet; and the ordinary well drills the deeper zones with an over-balance of up to 1240 psi. Because there is frequently a lost-circulation problem, lower mud weights could be used as it is evident that a weight of only 7.9 pounds per gallon (59 pounds per cubic foot) would provide a 400 psi overbalance.

In lost-circulation territory, the mud weight should, of necessity, be constantly checked and controlled by watering at the lowest value a study of the area has shown to be suitable. When a mud system is loaded with lost-circulation material, drilling proceeds with the shale screen bypassed and rapid weight increases can result from the re-circulation of cuttings and control of the weight is much more difficult. In many cases holding the weight down is disregarded because of faith in the efficacy of the lost-circulation materials. Occurrences such as the following are not infrequent: A lost-circulation zone is encountered and after considerable mud is lost one of the lost-circulation plugs is displaced into the loss zone. A fresh bit is then run and, using newly made, light-weight mud, drilling proceeds with full returns; but after further drilling circulation is again lost. The drillers generally assume that a new loss zone was encountered when actually it was the build-up in mud weight while drilling that broke down the original zone to cause the second loss.

A new tool to combat lost circulation is available, viz., the very low-weight drilling fluids made possible by the development of oil-emulsion muds. A 7.8 pounds per gallon (58 pounds per cubic foot) emulsion mud or an 8.2 pounds per gallon (61 pounds per cubic foot) saturated salt-emulsion mud can be built. The minimum weight of an oil-base mud is close to 7.5 pounds per gallon (56 pounds per cubic foot).

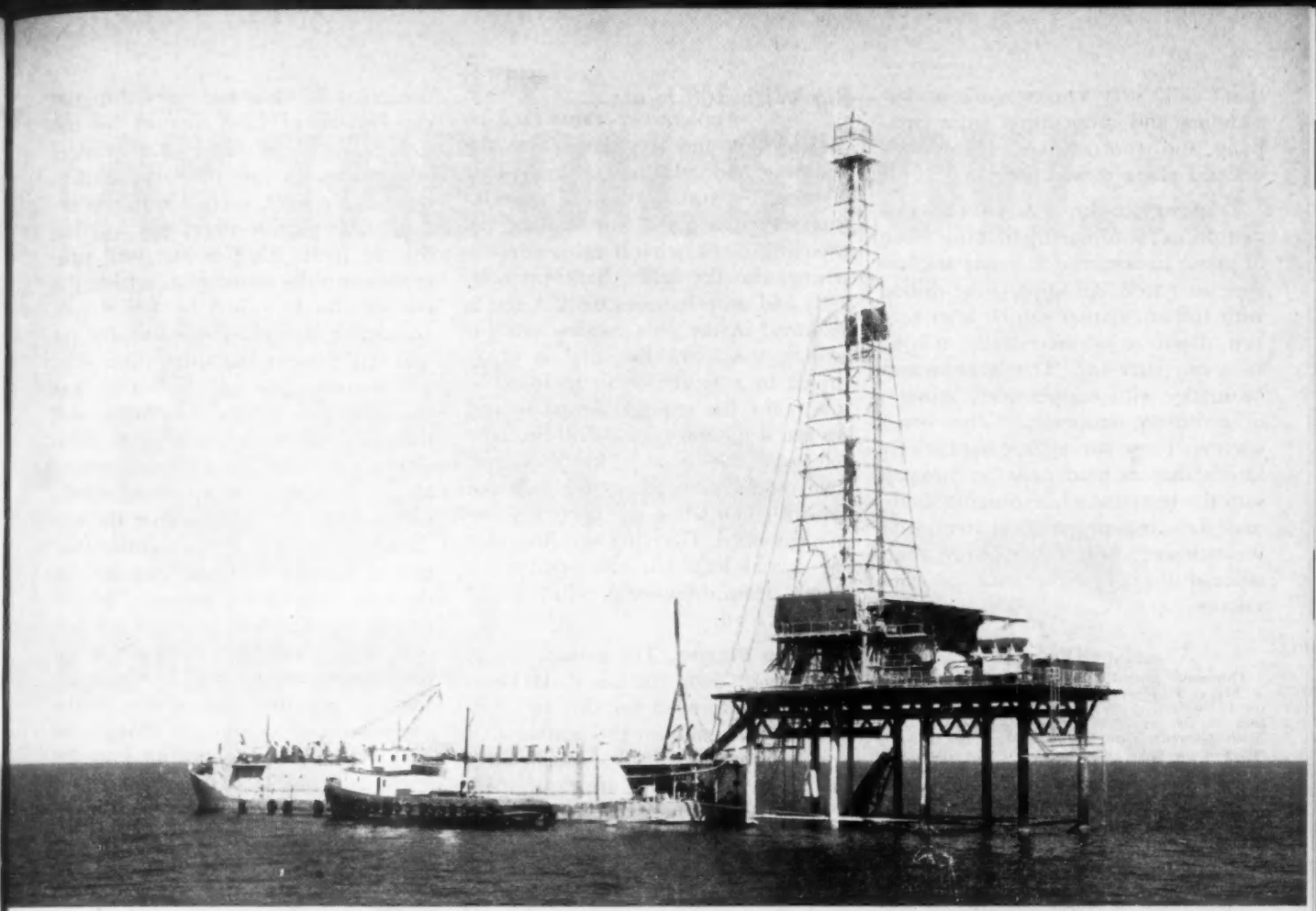
It continues to be said that oil-emulsion muds are expensive muds; that it is cheaper to use a 9.5 pounds per gallon (71 pounds per cubic foot) bentonite and chemical mud and accept the costs of lost circulation than it is to use a 9.0 or 8.5 pounds per gallon (67.5 or 63.5 pounds per cubic foot) emulsion mud. There is strong opinions, however, that the emulsion muds will prove to be cheaper because of faster drilling rate and longer bit life. Data are accumulating that the low-solids emulsion muds are even faster drilling fluids than water. Also, inasmuch as they do not take up solids as do clay-water muds, oil-emulsion muds are probably cheaper to maintain than the comparable, but higher weight, clay-water muds.

MECHANICALLY IMPOSED PRESSURES. W. C. Goins and associates presented in March, 1951, their paper, "Down-the-Hole Pressure Surges and Their Effect on Loss of Circulation"[7] (see also references 8, 9, 10). The work reported is widely recognized as a notable contribution to the drilling art. By means of pressure recorders mounted in the drill stem, the magnitudes of pressure surges developed while running drill pipe at different rates, from opening the pumps quickly or gradually, from spudding with the pumps running, were measured. It also was evident that running in with a plugged bit or with a float in the drill stem increased the pressure surges and that pumping with a balled-up bit and drill collar threw the full pump pressure on the formation. Consideration also indicates that the clearance between drill pipe and casing or hole is important. Larger clearances minimize both the pressure reductions in withdrawing the drill pipe (swabbing) and the pressure increases (surges) in running and handling the drill pipe. The extent of the measured pressure surges are best realized in terms of increased mud density. Rapid running in of the drill pipe gave surges equivalent to an increase in mud weight of 1.3 pounds per gallon (10 pounds per cubic foot). Spudding with the pump running gave surges equivalent to an increase in mud density of 2.3 pounds per gallon (17 pounds per cubic foot). When the pump was kicked open to start circulation, surges equivalent to an increase of 0.36 pound per gallon (3 pounds per cubic foot) in mud density were noted, as compared with the pressure when the pump was opened gradually. It is also evident that reduction of pump pressure to decrease the annular velocity will lower the pressure on the formations.

After this study was made, its teachings were applied to a new well in the Texas Gulf Coast. Oil-emulsion mud was used to eliminate balling-up and to secure a low-gel, stable mud. Increased clearances were secured by use of streamlined drill pipe and the elimination of the rubber casing protectors. A no-spudding rule was enforced, as was a requirement for gradual opening of the pump after the kelly was lowered to near bottom. No drill-pipe float was used and the stands were lowered at about 40 seconds per stand rather than the common 11 to 15 seconds per stand. The well was completed without a single circulation loss, as compared with 79 losses in the three prior wells in the same field.

Many wells can be recalled where circulation has been continuous until a certain round trip when, the fresh bit on bottom, returns could not be secured. Such losses are probably caused by the effect of the pressure surges while running in or in starting the pumps.

As stated, a difficulty in studying lost circulation is that in many fields there is no pattern to the location of the loss wells; they are simply scattered over the field. Many of these losses can be attributed to mechanically imposed pressures, and educational programs with the drilling crews will correct them. In the past



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two years, very encouraging understanding and cooperation from company and contract crews have developed along these lines.

LOCATION OF LOSS ZONE. It is evident from the foregoing that it is often of prime importance to locate the loss zone in a well. An upper zone drilled with full circulation can be later broken down or a successfully treated zone can later fail. The location can be made[8] with temperature, spinner, or resistivity-temperature (hot-wire) surveys. These surveys are not entirely satisfactory as mud must be pumped into the loss zone while running them, and their interpretation is frequently inconclusive; but, nevertheless, their successful application must be considered.

ACKNOWLEDGMENT

This paper originally entitled "Lost Circulation—a Major Problem in Exploration and Development," was written after some three years association in the work of API Southwestern District Study Committee on Drilling Fluids, and acknowledgment is made of the stimulation from discussion and the published work on the subject of other committee members. Although the study committee has sponsored the presentation, the paper is the responsibility of the author alone. Paper was presented at the Spring Meeting of the Southwestern District Division of Production, API, Fort Worth, Texas, March 4-6.

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(First of two parts)

Rig With 100 Hints

■ CONTINUED FROM PAGE 149

racking box and lays down over the walkway and telescopes into 34-foot sections, for transporting. The walkway serves as a bed for hauling the traveling block which is never unstrung, also the drill collars, rat hole, kelly and miscellaneous tools. A reel is mounted in the pipe racking box for storing the extra line and is chain driven by a reversible air motor. The air motor has enough power to reel up the dead end of the drill line and telescope the derrick for transport. The motor is reversed and reels out the drill line when the derrick is being extended. Carrying the line with the derrick load eliminates that much weight from drawworks, which is the heaviest load.

Rathole Digger. The rathole digger is an invention of the late R. H. Crow that was improved for this rig. The rathole has a sub on the bottom that can receive a used rock bit. Welded on the rathole digger are three strips of sucker rod. The rathole digger will allow the passage of the bit but turns by use of a chain drive from the rotary table. Then by means of a packoff at the top of the kelly and top of the rathole, mud circulation can be maintained through the bit. After digging the rathole, the packoff is unscrewed and the kelly removed. This also allows an easy and strong connection to pull the rathole after drilling the well. As is the accepted method in the oil field, the kelly is hauled in the rathole.

The doghouse trailer, designed specifically for this rig, is quite an engineering study in itself. Not only does it contain good practice such as individual lockers for each crew member, space for the radio transmitter offering communication to Crow's own system, tool boxes and lines, but also include such auxiliary items that were separate truck loads themselves on previous rigs. It contains such things as a stove, 2500-gallon diesel tank, complete lubricating oil for the rig, light plant, butane tank for small gas motors, water tank containing 60 barrels of washdown water, hydromatic brake, conventional brake, standby for cementing the well, etc. The tank on top of doghouse is higher than any of the cementing trucks, thereby eliminating the need for a pump.

The support for the derrick as shown in the insert, clearly illustrates the planning that has gone into the rig. Instead of fixed support for the foundation, large screws allow vertical adjustment. In case the foundation is not exactly level, each side moves independent of the other, still leveling the rig itself. Also, as the well progresses and the foundation settles, the derrick can be raised by this simple and quick method. Invariably the pit side settles more than the other side.

The special weight indicator was designed for diamond coring and delicate workover jobs. For a given weight, the indicator hand moves about 1⅓ times the standard movement. Also, the dead line is directly connected to the weight indicator piston, thereby reducing any friction through a connector linkage. This indicator arrangement has been used on other rigs belonging to Crow and has proved very satisfactory. It is so sensitive and accurate that on one fishing job where we desired to change the top of the fish by screwing into the stuck drill pipe and then backing off a safety joint and leaving one joint of drill pipe in the hole, it registered the loss of one joint of drill pipe from a 6000-foot string.

The wire line measuring device used for taking slope test and measurement checks is mounted on a bracket on the derrick leg and driven by a V-belt from the diesel generator drive at the rear.

Simple Rigup. To rigup is a simple and quick operation. The drawworks is driven into position and unloaded, then the derrick load is backed into position and the derrick is extended and put together. The derrick is then raised into position by a winch truck. The drill line is connected to the drum and the traveling block is used to raise one end of the dog house to the rotary floor level, while the other is ginned up by a winch truck. The supporting legs which are built on to the dog house, are then extended. Hoses with hammer unions are used throughout to save connection work and when these are connected, the rigup is complete.

Due to the compactness and design of this rig, one might get the impression that this is a small rig. However, upon closer examination, you will be convinced that it is a practical drilling rig, capable of drilling a 6000-foot hole. This point has been proven already by the previous wells that it has drilled.

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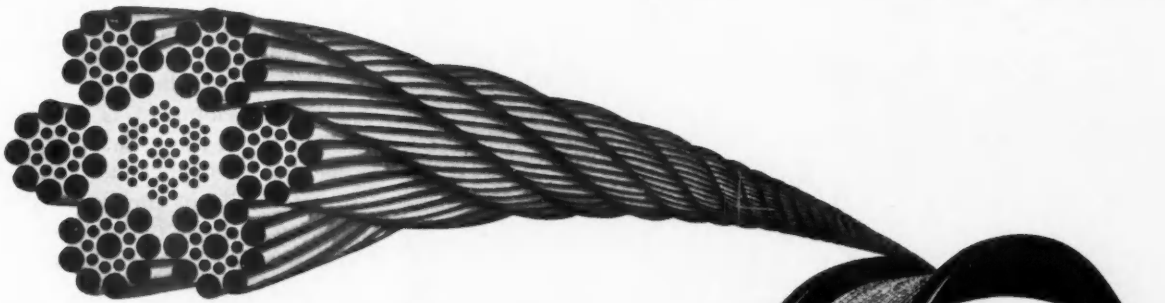

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A blowout occurring in mid-winter, particularly where the well blows gas and water, can result in a rig taking on this mound-of-ice appearance. In such cases, little can be done until spring, when ice will melt.

The snowdrifts mount and the mercury plummets to 60 degrees below zero, but here's how

Drilling Operations Continue The Year Round in Canada

By VERN H. HUNTER, District Superintendent
Redwater District, Imperial Oil, Ltd.

DRILLING OPERATIONS in Western Canada are carried on the year round despite severe winter conditions which exist from November until the end of March. In fact, in the muskeg areas of the north, most of the drilling is done during the cold weather when ground transportation is feasible and, where drilling is continued until after break-up, the rig must be left until the next winter.

No two winters are alike but temperatures sometimes go as low as —60°; and —35° is quite common. The winter of 1949-50 was particularly long and severe with the temperatures ranging from —35° to —60° for a period of six weeks without a break.

Winter conditions vary considerably between the bush country of northwestern Alberta and the plains of southeastern Alberta and southern Saskatchewan, the areas where most of the development is taking place. In the north the snowfall is considerable but drifting conditions are not severe; while in the latter areas the amount of snow is much less but the almost continuous winds, which keep the snow drifting, actually cause more trouble than low temperatures.

Bulldozers are practically standard equipment for the rigs during the winter, and when the wind is blowing it often is necessary to plow out a trail for one crew to get to work and then plow it out again for the crew going off tour. During blizzards, of course, nothing can move and the crew on the job has to tough it out until relief arrives, usually two or three days later. Most crews keep a small stock of food on hand for such occasions but usually run out of tobacco and, when this happens, snipes down to half an inch long are carefully retrieved.

Rigs Winterized. The first prerequisite of winter drilling is a well-winterized rig and many improvisations have been made over the year. In the old steam rig days of the Turner Valley field, it wasn't too difficult to provide heat wherever necessary; however, with the modern power rig and faster drilling the same does not hold true.

Winterizing presents a problem in areas of shallow drilling, where a rig is on location for a period of only two weeks to a month, as everything must be readily portable. In areas of deeper drilling, more time and money can be spent in winterizing but in every case it has been proven that a boiler is a prime necessity. Some operators use a low pressure boiler which does not require the services of a licensed steam engineer; others find it advisable to carry higher steam pressure and keep an engineer on shift in the boiler house.

Boilers must be regularly inspected

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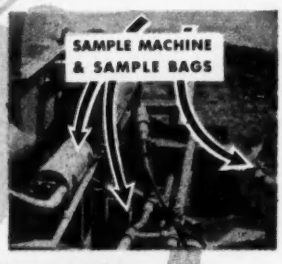

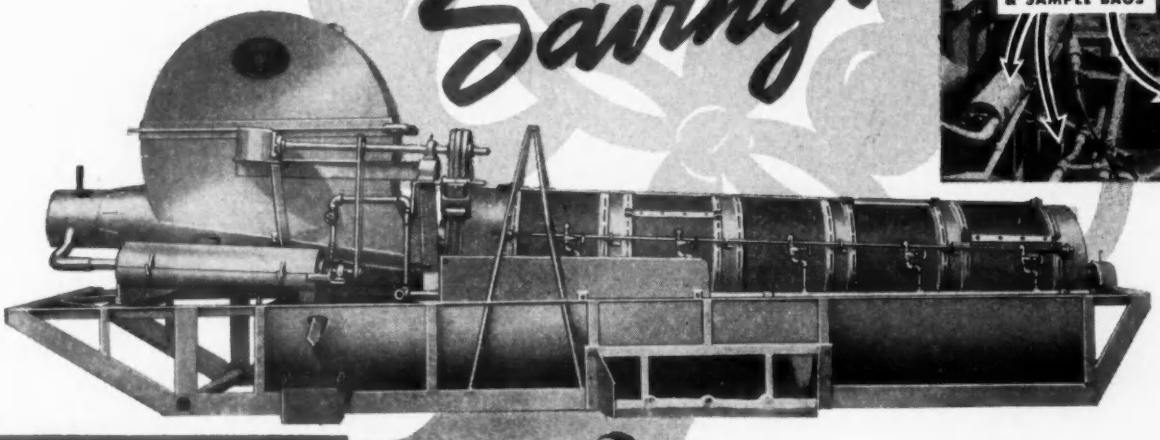

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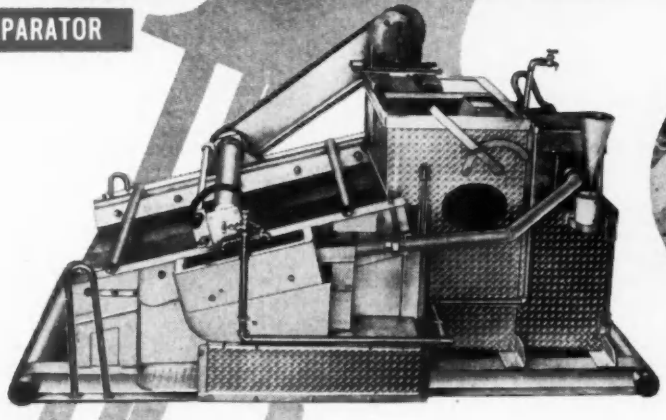

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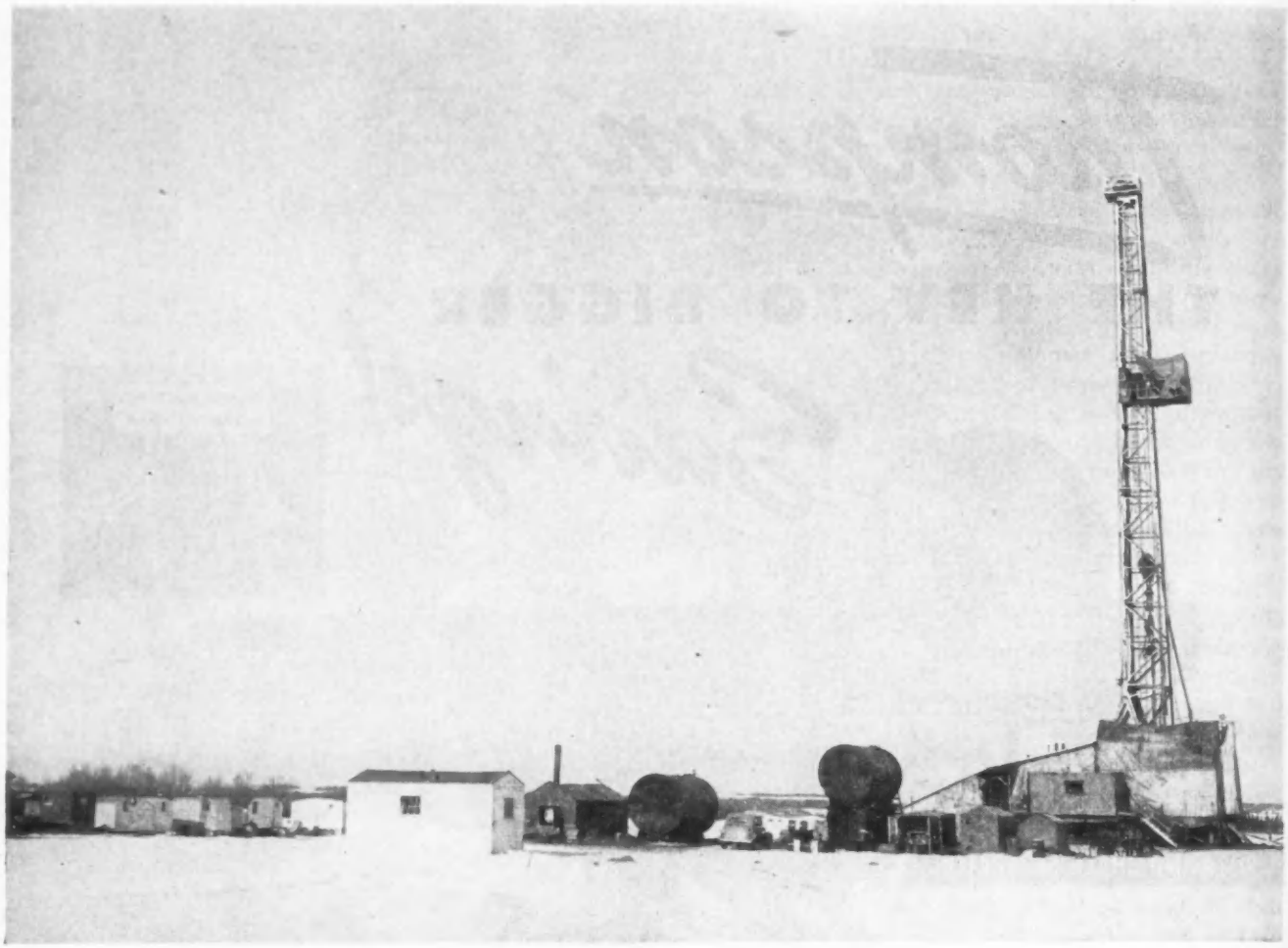


This is a typical winter drilling scene in Western Canada, with housed-in derrick floor, engine house and mud pumps. Heating boiler, in center of picture, is an essential piece of equipment.

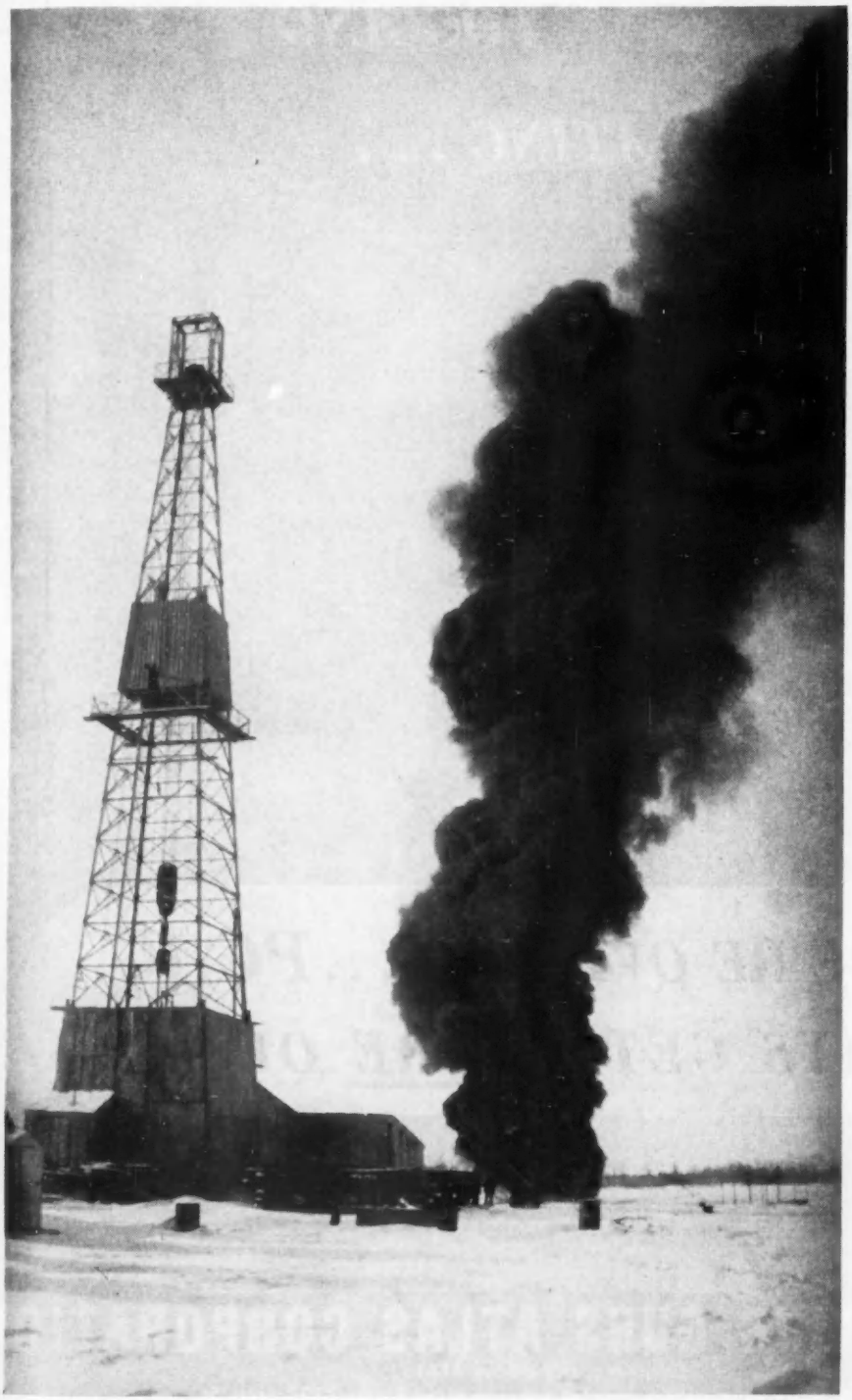
Many operators employ plywood panels, such as these on a Drumheller field drilling rig, bolted together for easy erecting and dismantling, to protect rig areas, sub-floor, engine house and mud pumps from temperatures sometimes as low as minus 35 degrees to minus 60 degrees.

During very cold weather, steam is used for various heating purposes, including steam hose for thawing out drill pipe and general derrick floor working areas. Often, steam vapor obscures driller's vision, and in many instances makes it impossible for him to see the derrick man.

by a government inspector and, in Alberta, must be located at least 150 feet from the well. Usually, they are unitized on skids along with the house for ease in moving.

Water supply lines are out of the question unless buried to a depth of six feet or traced by a steam line and boxed in. Therefore, the water for the rig usually is hauled by truck and stored in a tank close to the boiler house. The steam line from the boiler house to the rig is boxed in or buried in a shallow trench along with the water line and usually a return steam line. The return steam line is vented into the water tank to prevent freezing and conserve water.

As even winter grade diesel fuel will gel at 35° below zero, it is quite usual to set the fuel tank alongside the steam line and run the fuel line in the same box.



This is the first drillstem test at Imperial Leduc 1, discovery well of Leduc field, in February, 1947. Temperature then was 35 degrees below zero.

Plywood Panels Used. No amount of steam, however, will keep a rig running unless good housing is provided over the engines and pumps. Most operators construct the engine house and pump house out of plywood panels, bolted together in sections for ease in erecting and dismantling, although some use a heavy fire-resistant canvas. Heavy canvas makes a satisfactory shelter if kept in good repair. But it is subject to severe wind damage.

The windbreak around the derrick floor is usually made of the same material as the engine house and should be at least 12 feet high.

Enough heat is generated by the motors to keep a well constructed engine house reasonably warm, but the pump house must be heated by steam coils or preferably by blower type steam heaters which can be directed where most needed.

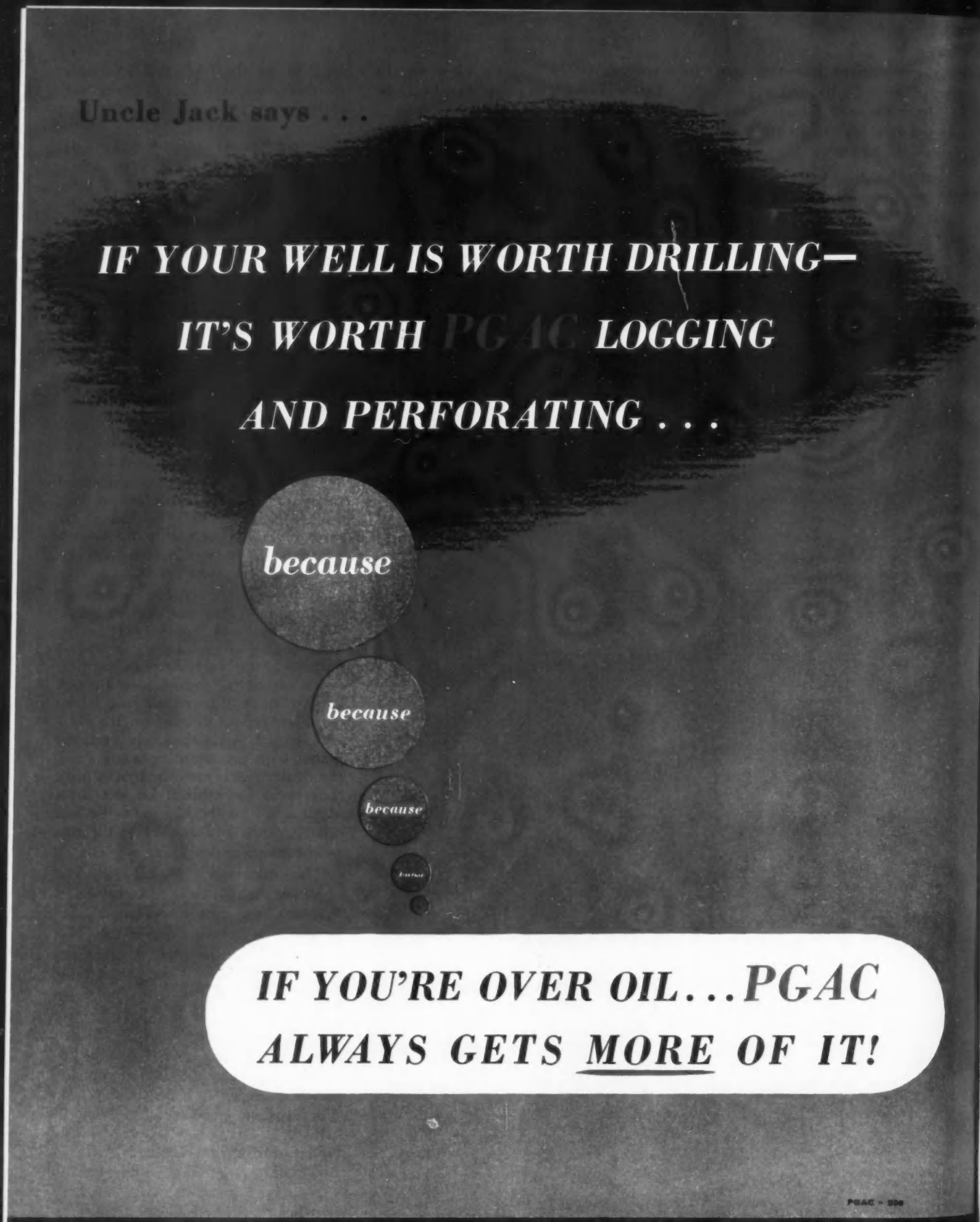
No heaters are required, or rather do any good, on the derrick floor. The drillers and roughnecks merely keep adding an extra shirt or suit of underwear for each drop in temperature and at 60° below they all look like wrestlers. The steam hose is the main weapon of defense on the floor and is used so continuously that, together with the steaming warm mud, the driller rarely sees the blocks after they leave the table if he sees them at all. He runs the blocks by the line on the drum and guesses at the rest by the noises and yells.

The derrick floor can be kept clear of ice by the regular use of hot water. Where water is hard to come by, ice on the floor becomes a problem. If it is allowed to accumulate on the floor, it will build up until the rotary table is like a Hudson car—you step down into it.

One contractor has solved this problem by using a steel grating instead of a solid floor. The grating allows the mud to drop through and it is easily steamed off.

Equipment Winterized. Blow-out prevention equipment needs particular attention during sub-zero weather and, unless well cared for is useless when needed. A well winterized rig will have the substructure boarded in and blower type heaters directed onto the preventors.

Hydraulically actuated preventors can become inoperable in severe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weather even with a light grade of diesel fuel in the system. Hydraulic brake fluid has been found to operate satisfactorily, although it is rather expensive.

Particular attention must be paid to the fill-up line which must be either circulated or blown out when not in use.

A blow-out at any time is a serious matter but in cold weather it is exceptionally troublesome; especially if the well is blowing gas and water. In a case like that nothing can be done until spring as a huge mound of ice is built up covering the whole derrick.

Problems arise while spudding-in during really cold weather, and, unless care is taken, the stand pipe and kelly hose will freeze even while circulating. This can usually be avoided by pre-heating the mud or water in the suction pit with steam.

After a depth of several hundred feet is reached, the mud becomes warm enough so that it will not freeze while circulating but some arrangement must be made to keep things thawed out while making a trip. Some operators circulate mud through the kelly, using a flow nipple on the rathole casing to direct the mud back to the pit; others blow out the kelly with steam. A crew forgets to blow out the kelly only once because taking down the standpipe and hose at 40° or 50° below, with a good stiff wind blowing is something to remember.

Ice Plugs in Drill Pipe. Keeping the tool joint pins on the bottom of the stands from freezing up during a trip is a matter of considerable importance. Enough mud dribbles down the inside of the stand to form a plug on the inside of the pin and if this is not steamed out before running in, it will thaw out when pipe is re-run into the hole and come shooting out like a shell out of a cannon.

One operator, at least, has solved this problem by using a flat steel pan with a rim about four inches high on the pipe rack. This pan is filled with hot water when starting out of the hole and warmed up occasionally by means of the steam hose. This prevents the plugs from forming and allows the stands to be readily spun in.

It is doubtful if any operator would run an extremely long casing string at temperatures lower than —45° because of the brittle nature of steel at low temperatures; however, strings of up to 6000 feet are run without regard to the thermometer. Here again, the steam hose comes into play to warm up each joint and steam off the threads. Lack of visibility with the steam hose in use is the biggest factor to contend with and extreme care must be taken by the driller to avoid injury to the crew.

The man on the stabbing board, without shelter from the wind, suffers considerably during casing operations and must be spelled at frequent intervals.

Cementing Operation. During cementing operations, precautions must be taken against the possibility of lines or equipment freezing up at a crucial moment. Usually, the cementer will plan to be on the lease well in advance of the deadline so he can have his equipment warmed up and turning over.

Water, kept warm by the addition of steam, is circulated continuously in the truck tanks until ready to go. Lines to the rig and the water supply tank are blown out with steam and kept uncoupled until the last possible moment. Warm water in the supply tank for the cement mix is essential to prevent a freeze-up during the cement job, but it should not be allowed to get too hot or a flash set of the cement may occur.

After the plug has hit, the rig becomes a beehive of activity. All lines must be immediately disconnected and blown out and the cementing equipment drained. Precautions must be taken to keep the last joint of casing and the valve from freezing and breaking. This is usually done by making a stove pipe of corrugated iron around the casing and inserting a steam hose in the bottom of it.

Well completion operations, on a well winterized rig, present no particular difficulty in cold weather except that men cannot accomplish the same amount of work as they can when it is warmer.

However, when tearing out, extreme care must be taken in draining the pumps and lines. Anti-freeze solution is used in the cooling system of the motors and this is usually left in during a move although at times it is necessary to drain it and heat it up before a motor can be re-started.

Extensive and expensive breakage can be caused by an inexperienced or careless crew in draining equipment, especially the mud pumps. It is not sufficient to just pull the drain plugs. The mud end must be dismantled and carefully washed out.

Actually, the coldest job in the oil fields is one that has practically disappeared since the mast has generally replaced the old standard derrick. Rig building in a Canadian winter, as can well be imagined, is a job that requires a greater stamina and resistance to cold than that of an Eskimo. Some men do it, however, and appear to like it.

On the whole, it has been found that drilling operations in Western Canada are slowed down from 10 to 15 percent during the winter. In individual cases, however, the slow down is much more pronounced and the experience gained by operators of long standing in this country can be profitably studied by newcomers to the area.

About the Author

VERN H. HUNTER joined the Imperial Oil Ltd. in 1923 after completing high school in Calgary. He spent three years in office work, then transferred to field operations on a cable tool rig. In 1928 he began roughnecking on rotary rigs in the Turner Valley field and spent the next 19 years as roughneck, driller and toolpusher in Turner Valley and on outpost operations in Alberta, Saskatchewan, Norman Wells and Northwest Territories. He was toolpusher on the discovery well at Leduc in 1947, the discovery which set off the development now taking place in Western Canada. The same year, he was appointed district superintendent of the Leduc District. In 1950 he was transferred to Redwater as district superintendent, the position he now holds.

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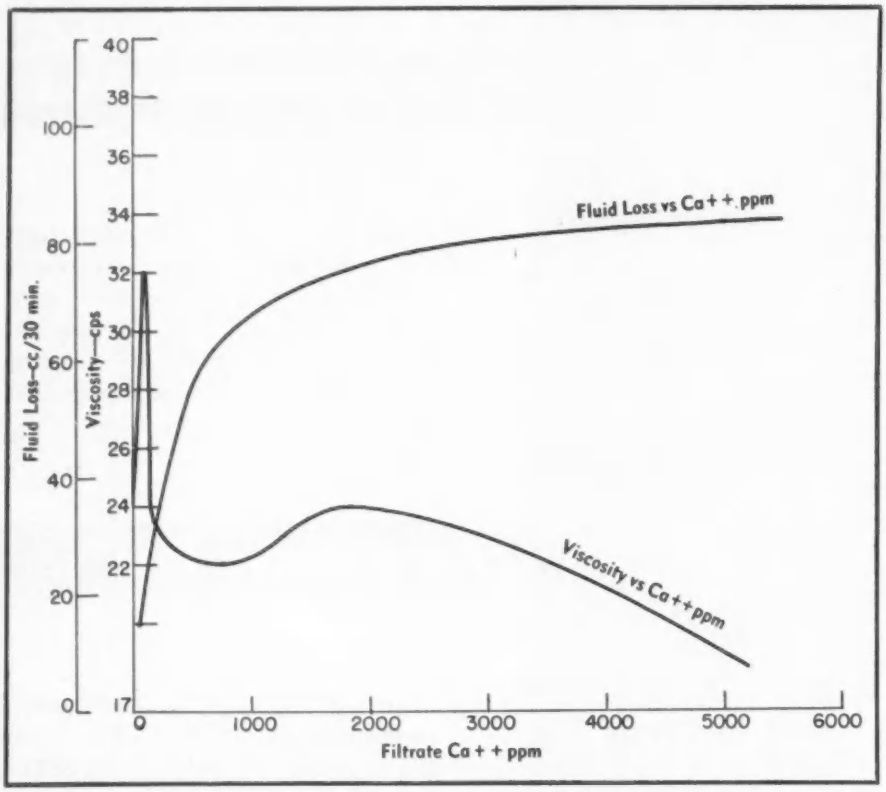

Salt contamination of six percent bentonite suspension. Bentonite hydrated before salt addition.

Here's How to Correct Your Mud Contamination

A discussion of the most common contaminants and the methods for handling each.

By H. L. STRIDER, Petroleum Engineer
Gulf Oil Corporation, Tulsa, Okla.

DURING THE COURSE of drilling a well, various agents may be encountered which adversely affect the drilling mud. When this occurs, it becomes necessary to initiate corrective measures to restore the mud to its original condition. On development wells it is possible to predict the type of contamination and the approximate depth at which it will be encountered. Preventive measures can be applied, thereby minimizing the detrimental effects resulting from the contamination. Improper handling of mud contamination can lead to serious consequences such as stuck drill pipe, blowouts, etc.

The three most common contaminants are cement, gypsum or anhydrite and salt. It is the purpose of this article to discuss the effects these contaminants have on various types of drilling muds and to present methods of handling each type of contamination.

Cement Contamination

Approximately 60 percent of dry cement is calcium oxide if all calcium is calculated to the oxide. Although only a small portion of the calcium contained in hydrated cement is present as free lime, $Ca(OH)_2$, the reaction between cement and a fresh water base mud is the same as that which would result by adding a given quantity of lime. While drilling cement a portion of the calcium ionizes and reacts with the colloidal fraction of the mud system. Since cement is an alkaline material, an increase in pH accompanies cement contamination.

1. FRESH WATER BASE MUD. The calcium that enters the mud system from cement flocculates clays in a fresh water base mud causing a rapid increase in gel strength, viscosity and filter loss. The increase in pH that accompanies cement contamination also aids in increasing the gel strength and viscosity. It is seen that the detrimental effects on the properties of a fresh water base mud resulting from cement contamination are due to two reactions.

The method of handling cement contamination depends upon a number of conditions. In the Mid-Continent area, the surface hole is drilled with a native mud which may contain enough bentonite to maintain the required viscosity. In this case the contaminated mud resulting from drilling the cement plug in the surface casing should be diverted to the reserve pit. If a minor amount of cement is to be drilled and there is an excess of mud in the system, the badly cement-cut mud can be discarded as it returns to the surface.

It is sometimes the practice to store the mud and drill cement plugs in casing with water and afterwards displace the water from the system with the uncontaminated mud. Preventing cement contamination in this manner is generally impractical due to the lack of facilities required for

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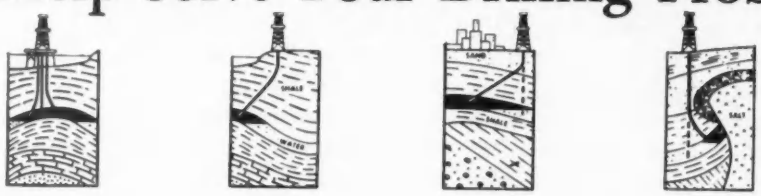

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such an operation. If a high quality mud is in the system and additional hole is to be made below the casing, or if a cement plug is to be drilled in an open hole, it will be necessary to treat the cement out with chemicals. In this case it is important that the mud be pretreated, thus minimizing the effects of cement contamination and the hazards resulting therefrom.

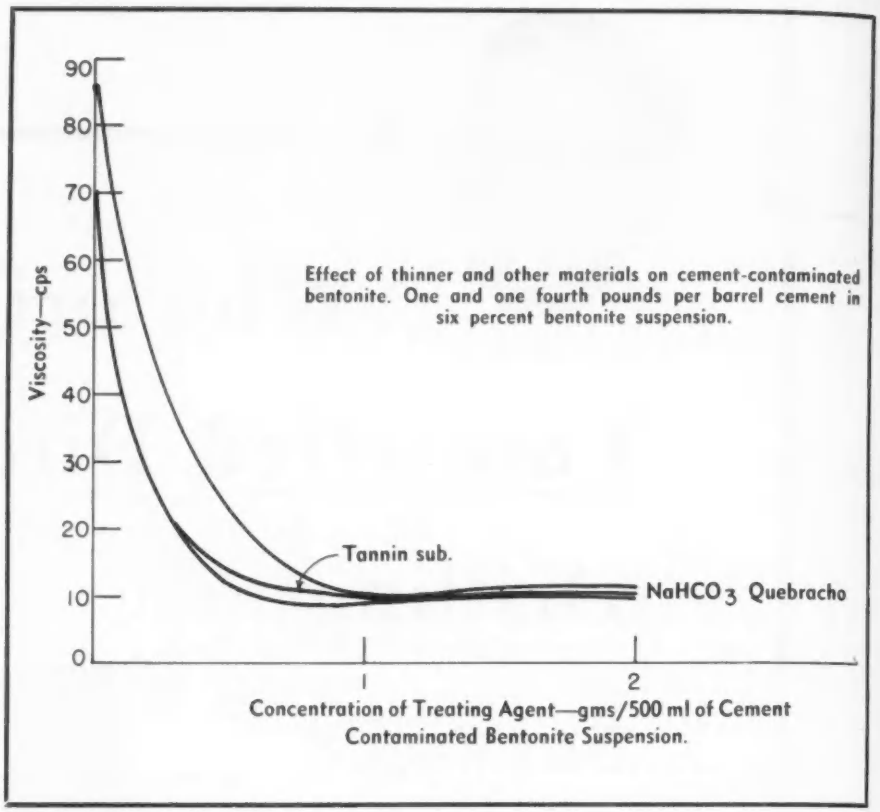
The agents most commonly used in treating out cement are sodium bicarbonate, $Na(HCO_3)$, and quebracho. Since sodium bicarbonate is the cheaper of the two chemicals, it is used more extensively. However it is believed that effective results are obtained with a greater degree of safety when these two chemicals are used in combination. The sodium bicarbonate precipitates the calcium and lowers the pH, and the quebracho serves as a thinner and also assists in reducing the pH.

The danger of overtreating with sodium bicarbonate is lessened if quebracho is used as a part of the treatment. Additionally, if quebracho is used in conjunction with sodium bicarbonate, the amount of sodium bicarbonate which can be added in pretreating the mud will be greater than that possible in a straight sodium bicarbonate treatment. The ratio of quebracho to sodium bicarbonate should be approximately 1 to 2. The sodium bicarbonate should be added through chemical barrel, and the quebracho added through the hopper. If the cement is hard, approximately 50 pounds total of quebracho and sodium bicarbonate is required per cubic foot of cement. However, if the cement is soft, as much as 100 pounds per cubic foot may be necessary.

Commercial cement treating agents are also used extensively to treat cement contamination in fresh water muds. Humus earth has been substituted for quebracho for cement treatment with supposedly good results.

Cement contamination in the heavily treated phosphate muds used on the Gulf Coast is generally treated by increasing the additions of phosphates to the mud in the amount required to combat the cement.

2. Lime-Base Mud. One of the principal constituents of a lime-base mud is lime, therefore cement does not detrimentally affect the properties of this type of mud. Fresh water muds have been converted to lime-base muds while drilling long cement plugs allowing the cement to furnish the required lime for the conversion.



Effect of thinner and other materials on cement-contaminated bentonite. One and one fourth pounds per barrel cement in six percent bentonite suspension.

3. Gypsum-Base Mud. Cement does not seriously affect "gyp-base" muds containing less than 2 or 3 percent salt. The gel strength and viscosity may increase due to the increase in pH but this can be combated by adding enough sodium bicarbonate to maintain an acceptable pH value. The pH at which the mud can be maintained without excessive viscosities and gel strengths can be determined by pilot testing.

If the cement is drilled with a "gyp-base" mud containing more than 2 percent salt and the pH is raised to approximately 9.5 or above, the calcium present will reduce the effectiveness of the starch considerably, causing a sharp increase in water loss. The increased water loss that results from cement contamination of a salty "gyp-base" mud should never be combated by adding more starch for this would be an extremely expensive treatment. There are four possible ways of handling cement contamination in a high salt content "gyp-base" mud and they are as follows:

- The calcium may be treated out with soda ash which in effect would convert the mud system to a high pH salt water mud.
- Maintain the pH below the point at which the calcium starts reducing the effectiveness of the starch by acid additions to the mud.
- Drill the cement plug with water and return to drilling with the uncontaminated mud.
- Jet the badly cement-cut mud to the reserve pit and mix new mud.

The first method of treatment is not recommended unless considerable salt is yet to be drilled below the plug. Additionally, the large quantities of soda ash that would be required to treat out the calcium may thicken the mud.

Fifteen percent hydrochloric acid has been used to treat cement contamination in salty "gyp-base" muds. However because of the unavailability

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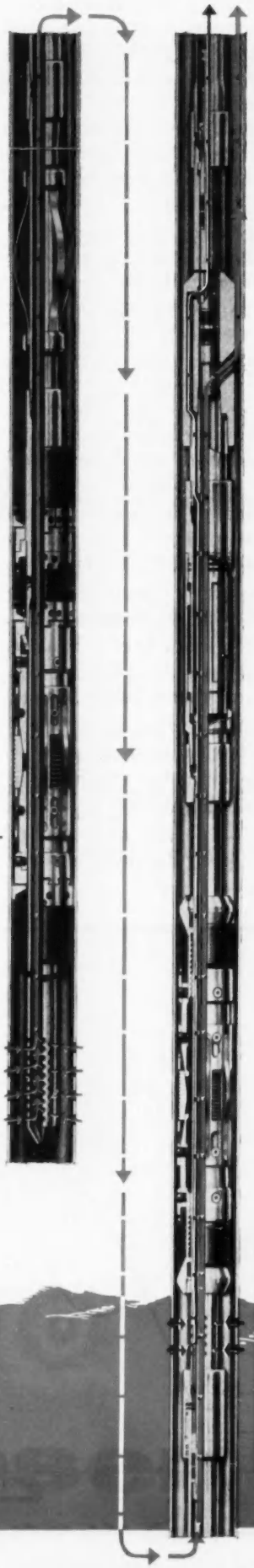

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of acid at the time of need plus the fact that considerable care must be exercised when adding the acid to the mud to prevent excessive gel strengths and viscosities, the use of acid has not become widely accepted as a method of treating cement contamination in a salty "gyp-base" mud.

Drilling the cement plug with water would be a suitable solution to this problem in all cases except where the casing is set in the pay formation and where a cement plug is being drilled in an open hole.

Jetting the badly cement-cut mud to the reserve pit and mixing new mud is also practiced. There is a natural reluctance to follow this method, although in the long run it may be the most economical.

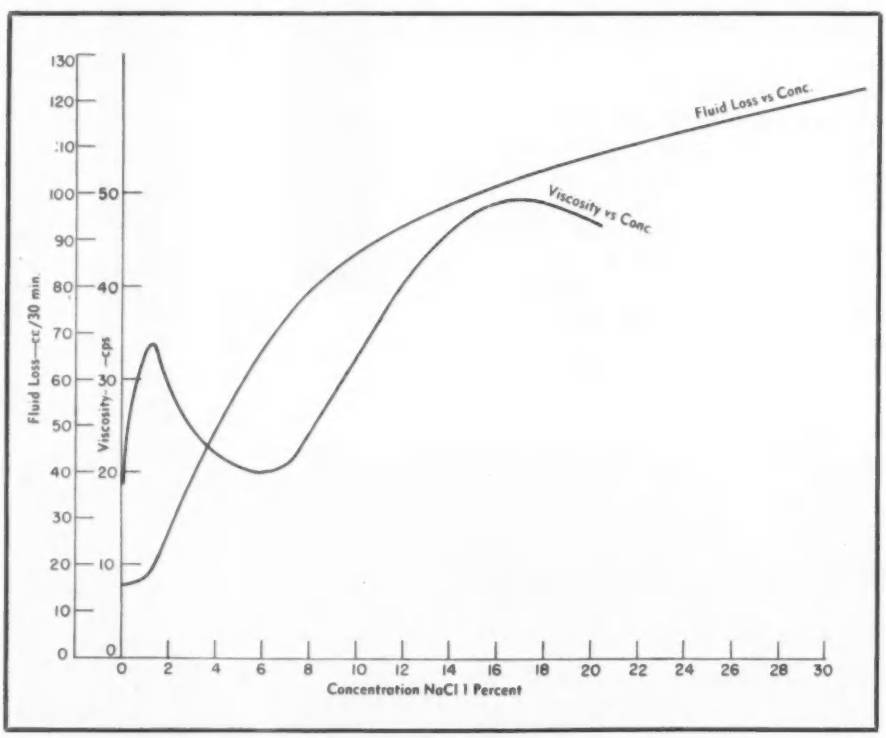
Fortunately the problem of cement contamination in a high salt content "gyp-base" mud is rare. Frequent pilot testing of the mud during the cement drilling operations may indicate the best method of treatment.

4. Salt Water Mud. A salt-water mud that is free of gypsum or anhydrite may be used to drill cement without difficulty. However, if the mud contains enough gypsum or anhydrite to give in the neighborhood of 400 ppm calcium or above in the mud and starch is being used to control water loss, cement contamination will result in an increased filter loss providing the pH goes above 9 or 9.5. The reaction here is the same as that discussed under "gyp-base" muds.

In order to prevent the cement from adversely affecting the mud, the gypsum and anhydrite should be treated out before drilling the cement. It may be necessary to add soda ash as the cement is being drilled to maintain the calcium concentration below 400 parts per million. It should be pointed out that no treatment would be required if starch were not being used.

5. Oil-Emulsion Mud. An oil-emulsion mud is affected by cement in the same manner that cement affects the base mud in which the oil is emulsified. For example, the properties of a fresh-water base oil-emulsion mud will be damaged by cement to approximately the same extent that cement damages the properties of a fresh-water base mud. The method of treating the base mud would apply to an oil-emulsion mud.

6. Oil-Base Mud. Cement does not affect the properties of most oil base muds.


Fluid Loss vs Conc.
Viscosity vs Conc.
Fluid Loss—cc/30 min.
Viscosity—cps
Concentration NaCl I Percent
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
130 120 110 100 90 80 70 60 50 40 30 20 10 0
50 40 30 20 10 0

Effect of calcium contamination on six percent bentonite suspension (Bentonite prehydrated).

Gypsum or Anhydrite Contamination

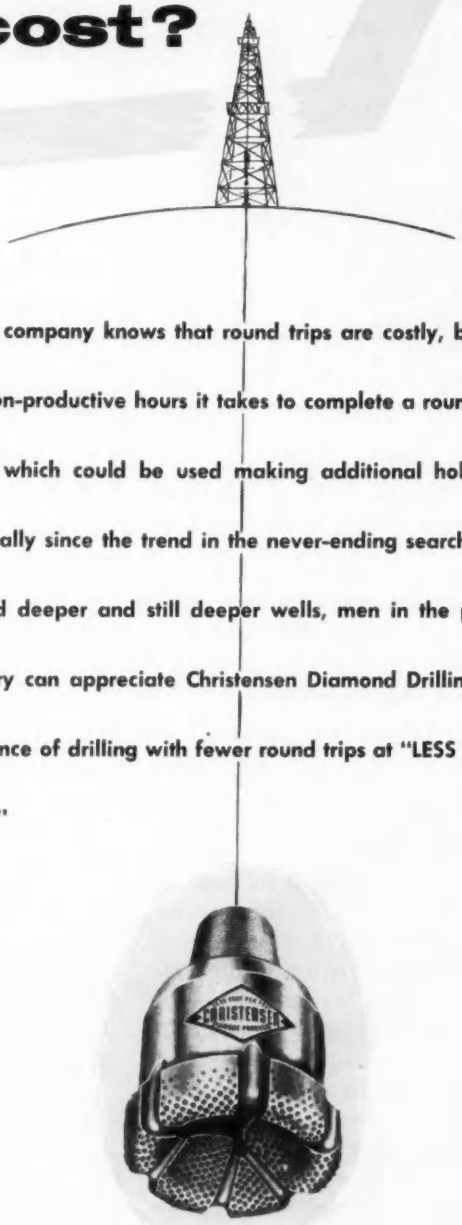
Gypsum or anhydrite contamination results from drilling beds of this compound which range in thickness from that of stringers of several inches to beds several hundred feet thick. "Gyppy" makeup water is also a source of this contaminant. Gypsum and anhydrite are the common names for calcium sulfate, $CaSO_4$. Gypsum is calcium sulfate that is chemically combined with water while anhydrite, as the name implies, is free of water. Regardless of their chemical composition, both compounds affect drilling muds in the same manner and may be thought of as one compound.

1. Fresh Water Base Mud. Gypsum and anhydrite contamination is one of the principal mud problems encountered in the Rocky Mountain area. These contaminants flocculate the clays in a fresh water base mud causing a rapid increase in gel strength, viscosity and water loss.

As a rule, soda ash may be used to treat out gypsum and anhydrite in a fresh water base mud if not more than 100 pounds per day is required. If the requirement exceeds this value, it is considered more economical and less hazardous to use barium carbonate, $BaCO_3$, as the treating agent. A high concentration of sodium sulfate, one of the products of soda ash treatment, will increase the gel strength and viscosity of the mud which will necessitate the additions of water which in turn will increase the mud maintenance cost. Before drilling into a thick bed of gypsum or anhydrite with a fresh water base mud, the mud should be treated with 20 or 30 sacks of barium carbonate. The amount of barium carbonate needed daily can be determined by frequent testing. It may be necessary to add carboxymethylcellulose (CMC) while drilling gypsum or anhydrite if a low water loss is desired.

2. Lime-Base Mud. The lime-base muds are resistant to gypsum and anhydrite contamination. Lime-base muds are used in the Rocky Mountain area to drill thick beds of gypsum and anhydrite. Whether it would be economical to use a lime-base mud for this purpose would depend upon the mud weight that could be carried. To maintain a lime-base mud weight

How much does a round trip cost?



Every company knows that round trips are costly, because of the non-productive hours it takes to complete a round trip . . . hours which could be used making additional hole. Today, especially since the trend in the never-ending search for oil is toward deeper and still deeper wells, men in the petroleum industry can appreciate Christensen Diamond Drilling Bits for assurance of drilling with fewer round trips at "LESS COST PER FOOT."

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below 10 ppg would be exceedingly costly and especially so if a high viscosity is also required.

3. Gyp-Base Mud. The "gyp-base" mud is also resistant to gypsum and anhydrite contamination. One of the disadvantages of a "gyp-base" mud is its inherent high flat gel strengths. For this reason the "gyp-base" mud would be undesirable where lost circulation is a problem.

4. Salt-Water Mud. Gypsum and anhydrite do not damage salt-water muds. A salt-water mud is never used specifically to drill these formations, for the amounts of salt that would have to be added to maintain the mud would result in very high maintenance cost.

5. Oil-Emulsion Mud. As in the case of cement, whether or not gypsum or anhydrite would damage its properties would depend upon how these contaminants affect the base mud in which the oil is emulsified.

6. Oil-Base Mud: Gypsum or anhydrite does not detrimentally affect the properties of an oil-base mud.

Salt Contamination

1. Fresh-Water Base Mud: As the salt content of a fresh-water mud approaches 1 percent, the gel strength, viscosity and filter loss increase slowly. An increase in salt content above 1 percent results in a rapid increase of these properties. Since there is no known economical method of treating out salt, the mud system must be converted to one that is resistant to salt contamination. If the salt occurs in thick sections it would be necessary to convert the system to a salt-water base mud. The salt content would have to be maintained near the saturation value to prevent the salt sections from dissolving out and forming large cavities.

If salt occurs in thin stringers and a high quality mud is required, the fresh water mud system can be converted to a "gyp-base" mud. At the request of the Canadian Gulf Oil Company, a service company developed the gyp base mud in 1948 to drill thick anhydrite beds and underlying salt beds for use in the Stettler area of Alberta, Canada. This mud was first used on a Candian Gulf wildcat well in this area. The "gyp-base" mud is also being used for this purpose in the Williston Basin.

about the author

H. L. STRIDER is a drilling engineer for the Tulsa division of Gulf Oil Corporation. He served in the Army from 1943 to 1945. In June, 1949, he graduated from the University of Missouri with a B.S. degree in chemical engineering, at which time he was employed by Gulf. At present he is actively engaged in drilling mud work.

2. Lime-Base Mud: Lime-base muds will withstand from 2 to 3 percent salt. However, higher salt concentrations will cause the lime-base muds to thicken and become very difficult to handle. The mud system should be converted to a salt-water mud or gyp-base mud depending upon the nature of the salt beds.

3. Oil-Emulsion Mud: Salt will contaminate the fresh-water oil emulsion and the lime-base oil-emulsion muds. If an oil-emulsion mud is desired, a salt-water or "gyp-base" oil emulsion mud can be utilized.

4. Oil-Base Mud: Oil-base muds are resistant to salt contamination. When salt is drilled with an oil base mud, the salt remains in the solid form and is carried out of the hole with the cuttings.

Conclusion. The foregoing discussion has been devoted to the effects of cement, gypsum, and salt contamination on various types of drilling fluids and the methods by which the contamination should be handled in each mud. As was pointed out certain types of muds are resistant to one or more of these contaminants. In deciding whether to combat these contaminants by treating them out or by using a mud that resists them, several factors must be considered. In the case of salt contamination this question is resolved into what salt resistant mud should be utilized since salt cannot be treated out. Generally it may be stated that if the salt occurs in thin beds in a well where a high quality mud is required, the "gyp-base" is suitable and is considered more economical than a salt-water mud. However, if the salt contamination results from massive beds of salt, it will be necessary to use a salt-water mud with high salt content to prevent large cavities from forming.

The type of mud that should be used in drilling gypsum and anhydrite depends upon the amount of the contaminant to be drilled, nature of the shales that must be maintained, the amount of salt that is present, and the mud weight that must be carried to either prevent lost circulation or control high formation pressures. In general, if more than 150 to 200 feet of gypsum or anhydrite have to be drilled with a high quality mud, muds that resist this contamination should be considered. If enough salt is present with the gypsum or anhydrite to produce more than a 2 percent concentration of salt in the drilling fluid, the only alternative is the utilization of a gyp or salt-water mud.

If lost circulation is a problem and mud weights below 10 pounds per gallon must be carried, in all probability the use of a fresh water base mud and treating out the gypsum would be more economical than either the use of the gypsum or lime-base mud. Maintaining the weight of a lime-base mud below 10 ppg with an acceptable viscosity in deep wells would be extremely expensive. If mud weights above 11 ppg are required to control formation pressures and troublesome shale beds are exposed, the lime-base mud may be used to an economical advantage.

As is seen there are many factors which must be considered in designing a mud program to combat the contaminants that may be encountered in the course of drilling a well. Only by analyzing these factors in the light of each other can the most economical and safest mud program be selected.

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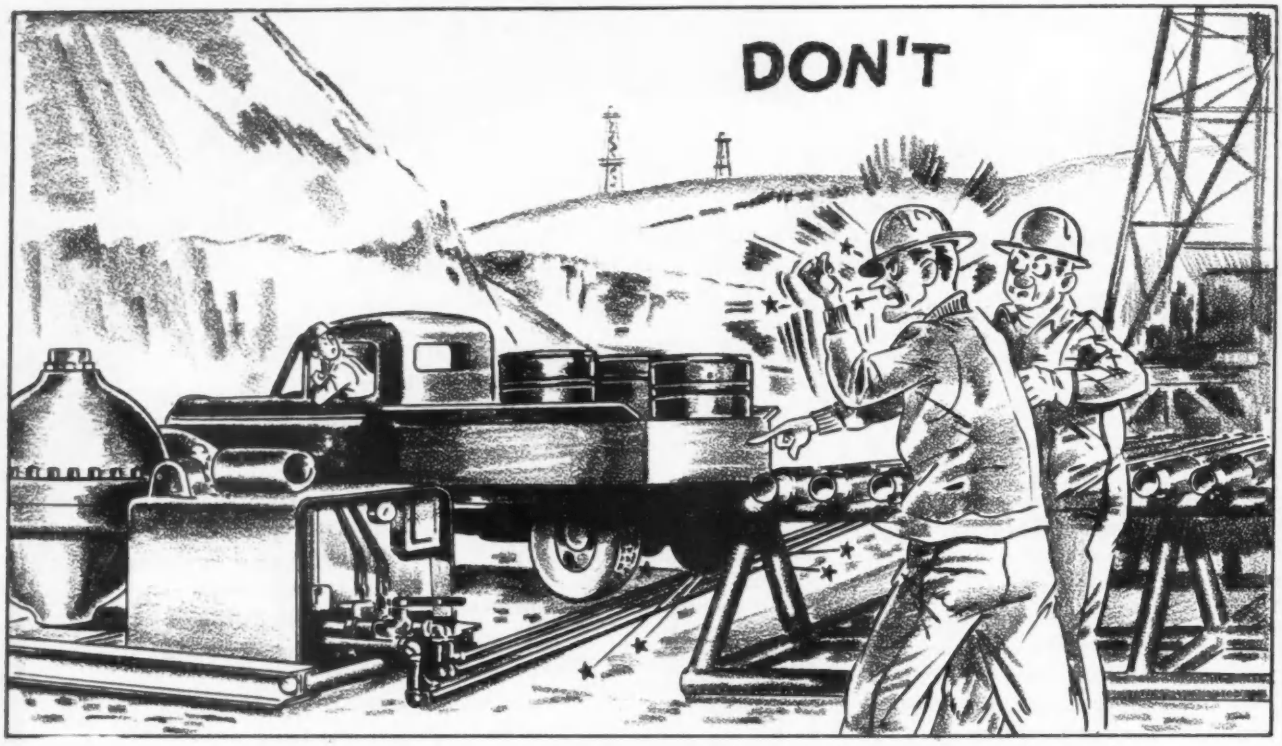
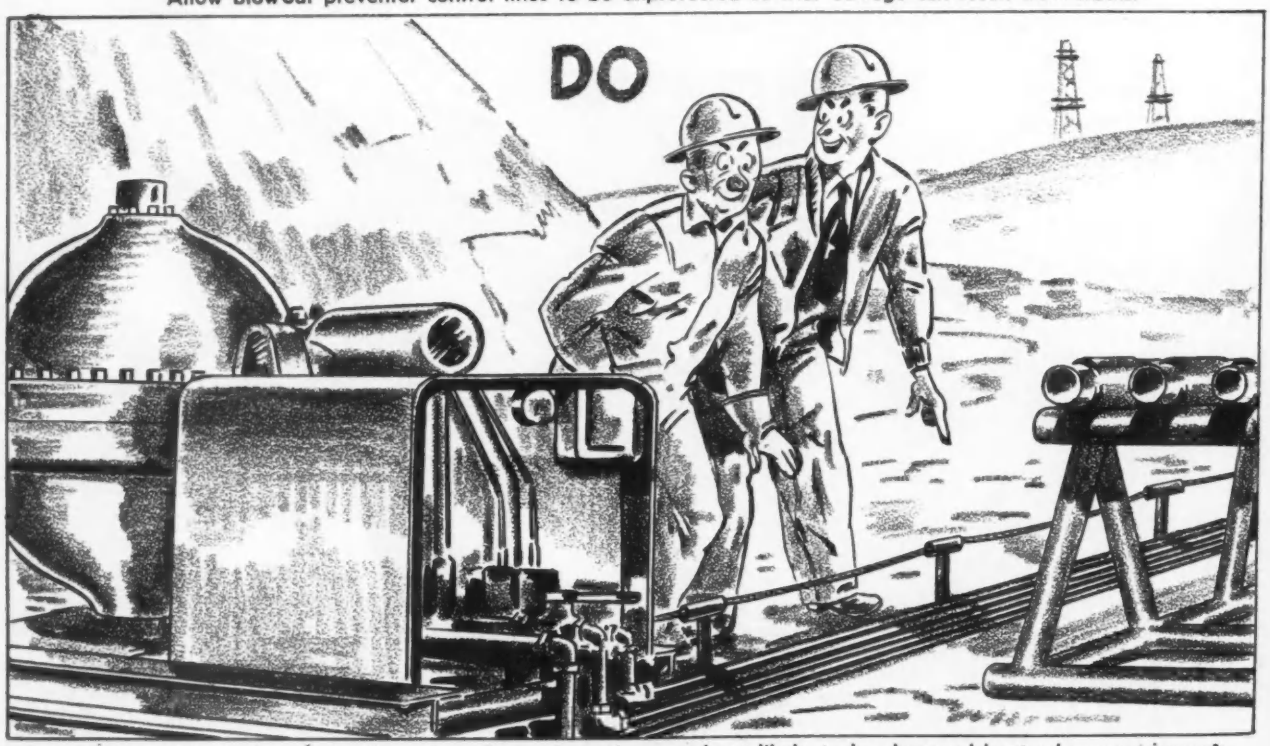


Allow blowout preventer control lines to be unprotected so that damage can result from trucks.



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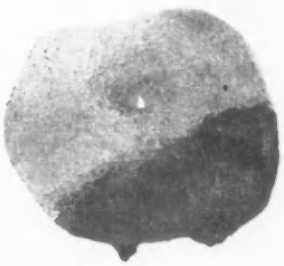

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Current Drilling Practices In West Texas

- **Effect of hydraulic horsepower**
- **Chert vs. conventional bits**
- **Straight hole drilling**
- **What are the trends?**
- **A discussion of equipment**

By DAVID JOHNSTON, Humble Oil & Refining Company, McCaney, Texas
and W. R. JOHNSON, Humble Oil & Refining Company, Midland, Texas

ANOTHER FACTOR which has hindered improvement with the jet bits is the widespread use of 3½-inch drill pipe and 2-inch or 2¼-inch bore drill collars. Some West Texas operators are using, and more are contemplating the use of 4-inch OD drill pipe which has a tool joint only slightly larger than 3½-inch drill pipe. The 4-inch drill pipe can be used safely in 6¾-inch hole and is considered safe by some operators for use inside of 7-inch casing. As shown in Figure 2, an additional 170 pump horsepower is required for jet bit operation at 8000 feet with 3½-inch drill pipe when compared with 4-inch drill pipe. Inasmuch as the nominal weight of 4-inch drill pipe is 14 pounds, compared with 13.30 pounds for 3½-inch, the increase in hook load at 8000 feet would be small. Drill-collar bore can also be very critical. Assuming a rig pumping 300 gallons per minute through 600 feet of 2-inch bore drill collars, 82 hydraulic horsepower would be required just to pump through the collars. If the bore were increased to 2¼-inches, the hydraulic horsepower required would be reduced to 48 and with a 2½-inch bore to 28 hydraulic horsepower. The loss in weight of the collars would be only 6 pounds per foot if the obre were increased from 2 to 2½ inches.

All of the factors mentioned have contributed to the problem of evaluating the jet rock bit in West Texas. Based on Humble's experience, jet bit performance in West Texas may be evaluated as follows:

- From the surface through the red beds, salt, and anhydrite section to the San Andres formation, results have been very good with increases in penetration rate as much as 50 percent and a reduction in the number of bits by as much as 50 percent.

- From the San Andres to the Devonian, no readily apparent increase in penetration rate, but a reduction in the number of bits by as much as 50 percent.

- From the Devonian through the Montoya, no conclusive data; but the drilling of this section is not as great a problem since the advent of the tungsten carbide chert bit.

- From the Montoya into the Ellenberger, enough increase in both bit life and penetration has been noted to justify the use of the jet rock bits.

The West Texas Subcommittee of the Southwestern District Jet Bit Study Committee has been organized. This group intends to analyze jet rock bit results in the West Texas area with the hope of determining which formations can be drilled more economically with jet rock bits and what hydraulic conditions are needed to effectively use jet bits. In addition, it is intended to arrive at some recommendations concerning drilling equipment to allow greater available horsepower for the use of interested operators as they replace or purchase pumps, drill pipe, and drill collars. The interest in this group is very active as is the interest of most West Texas operators; and it is anticipated that a great deal concerning the use of jet rock bits will be learned in the coming year.

Part 2

Chert Bits. Probably the most important improvement in hard formation bits for the past decade has been the development of the chert bit. Figures 5 and 6 show two types of the chert bit, and several other manufacturers are known to be experimenting with similar bits.

The chert bit is a prime example of the old adage "never judge a book by its cover." When the bit companies were conducting initial tests with the bit about two years ago, most drillers expressed positive opinions as to how much hole that bald-headed dull bit would make. They were pleasantly surprised to discover that the bit would drill on an average of 5 to 7 times as much hole as a conventional bit and, in many cases, 10 to 20 times as much. Chert bits are expensive, costing around $1050 in the 8¾-inch size. The payout of the bit depends on the operating cost of the rig involved, amount of hole made with conventional bits, amount made with the chert bit, and whether reamer cutters can be omitted using the chert bit. One operator using a $50 per hour rig and no reamers with the chert bit estimates that the bit pays out if it makes as much hole as 2½ conventional bits. This is arrived at as follows, assuming the penetration rate of both chert and conventional bits is the same, which is usually true.

Various costs may raise economical rates for the bit or even lower it at depths requiring slow trips; but in general, in formations containing 30 percent chert or more, the bit can be used economically when conventional bit performance drops below 20 feet per bit. In any formation it is worth trying when conventional bit performance drops below 15 feet per bit. On

a recent Humble well in eastern Andrews County, 8¾-inch bit performance was poor in the Mississippian at around 12,000 feet. Bits were making only 10 to 25 feet and the formation was hard lime with a small amount of chert. The first chert bit made 93 feet in 34 hours and the second made 100 feet in 35 hours. The bits were run with 30,000 to 35,000 pounds at 30 to 35 revolutions per minute; and, considering the trip hours saved, their use was certainly justified.

There are many possible variations of the chert-bit construction, and it is believed that types of the bit will be developed that will reduce drilling time in all hard formations. The present bit utilizes spherical-nosed compressed tungsten carbide teeth and is effective in the very brittle formations that will drill by crushing. It is possible that sharp tungsten carbide teeth will cut the so-called tough formations such as the slow-drilling deep shales. Other possible variations are the use of the carbide compacts in the reaming edge of conventional hard-formation bits and a combination of carbide teeth and sharp conventional teeth on a bit to drill the broken chert and lime or shale formations often encountered in West Texas.

The chert bit has been used to drill broken formations in the following manner. As long as the drilling time stays normal for chert formations (five feet per hour) the chert bit is used. If the rate slows, indicating shale or lime, the bit is pulled and a conventional bit is run until chert is encountered again. Experience is needed in an area to use the chert bit economically in this manner, but it does illustrate the possibility of the development of a bit using a combination of conventional teeth and the tungsten carbide compact teeth. Future development of bits using compressed carbide and possibly other metals will certainly reduce hard-formation drilling problems.

Straight Hole. It is estimated that at least 20 per cent of the holes drilled in West Texas are drilled with reduced weight through one or more sections because of crooked hole. The crooked-hole problem has increased with the trend toward high bit weights and is now at the point where a great deal of experimentation is being carried on in an effort to combat crooked hole. Most operators are using some forms of stabilization. Some are stabilizing through the use of reduced bit weight and, consequently, have less buckling in the drill-collar string; but this method is expensive because of the reduction in penetration rate with light weight. Others are using string reamers with smooth rollers placed at various places in the drill-collar string with the idea of reducing buckling. A common method of placing the stabilizers is to notice the shiny areas in the collar string and to install the reamers at these points with the idea that the shiny areas are caused by the collars contacting the walls of the hole.

Many operators are trying the various types of sleeve stabilizers now on the market. Either a bottom collar, usually equipped with four sleeves, or a sub with one sleeve is used or sometimes both. In fact, practically every conceivable combination of reamers, stabilizers, and sleeve-type stabilizer has been tried.

An increasing number of operators are using large drill collars. Humble has adopted the practice of using 15 7¾-inch collars in 8¾-inch hole; 15 7-inch collars in 7⅞-inch hole and 18 6-inch collars in 6¾-inch hole in all areas where the salt section is cased off and no abnormal drilling problems are expected. Several others use a combination string of three or more oversize collars directly above the bit, with the remainder of a size capable of being washed over. There is a definite trend toward larger collars, i.e., the use of the 7-inch collar in 8¾-inch hole. Seven-inch collars can be washed over (8⅛-inch OD flush joint) in short intervals and offer better stabilization than the commonly used 6¼-inch collar, and also can have a 2¾-inch bore which reduces the hydraulic losses.

Two interesting facts concerning large drill collars have been noticed recently. In a recent API committee meeting where a number of operators using oversize collars and full gauge sleeve-type stabilizers were represented, fishing for oversize strings was discussed. Not one operator has lost or had heard of anyone else losing a string of oversize collars in the West Texas area, nor had any operator found it necessary to wash over a sleeve-type stabilizer. Undoubtedly large collars have been and will be lost in West Texas, but it does appear that the possibility of losing oversize collars is considerably less than generally assumed by most operators. The average fishing job with oversize bottom assemblies is stuck pipe, and is cleared up with the use of oil or a backoff shot and subsequent use of jars. In cases of drill collar joint

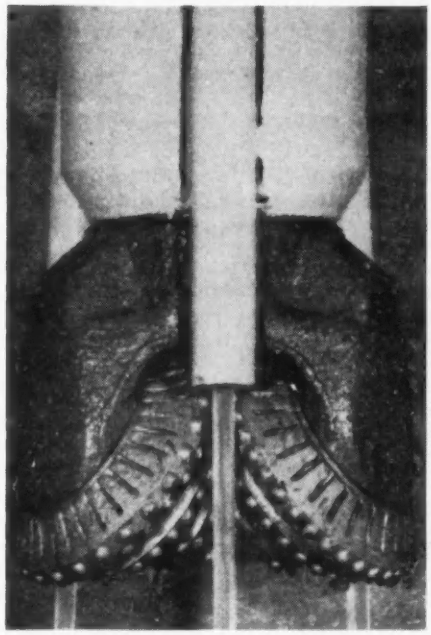

FIGURE 5.

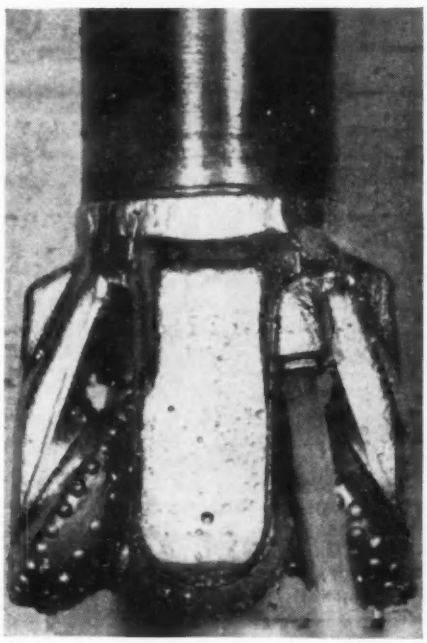

FIGURE 6.

TABLE 5
Cost Comparison
Chert vs. Conventional Bits—8¾-inch Hole

CHERT		CONVENTIONAL	
Cost of One Bit	$1,050	Cost of 2½ Bits	$ 389
One Trip	200	2½ Reamers	338
		2½ Trips	500
	$1250		$1227

failure, a tapered tap may be used or a fishing neck can be cut with a diamond shoe to enable the use of an overshot.

Humble has used a string of 15 7¾-inch collars in 8¾-inch hole for 20 months without a collar failure; and recently it was found the average outside diameter of the collars is now 7⅝-inch. This may be compared with the accepted average collar wear using smaller collars, which is ¼-inch of diameter per year for the West Texas area. This low rate of outside-diameter wear with larger collars is probably a result of reduction in buckling over smaller collars, reduced rotary speeds, and possibly because the high velocity of the mud in the restricted annulus with the large collars exerts some force to keep the collars from rubbing the walls of the hole.

In addition to stabilization, one other method of combating crooked hole shows some promise. Percussion drilling has been experimented with for a number of years and has shown some tendency to drill a straight hole. However, only a few percussion-type drilling tools have been developed to the stage that they could be used for drilling enough hole to evaluate their straight-hole drilling or hole-straightening properties. Recently one tool has been developed by a major bit company which shows promise of being an aid to straight-hole drilling. Recent field tests have indicated that, at least in some areas, holes can be straightened with this tool and still maintain a reasonable rate of penetration. Another year should see a full evaluation of this and possibly other percussion-type tools.

All of the above-mentioned methods of combating a crooked hole and drilling a straight hole have met with varying success and the most economical method has not been determined. The Southwestern District Study Committee on Straight-Hole drilling has been organized with members from West Texas organizations, inasmuch as the problem appears to be more serious in that area. The group is attempting to obtain information concerning the straight-hole drilling problems in the various West Texas areas and the method used in solving the problems. The ultimate aim of the group is to determine and advise interested parties in the industry of the most economical method or methods of combating crooked hole. Considerable progress is expected during the next year.

Drilling Equipment. There are several items of drilling equipment that deserve some mention in any discussion of Permian Basin drilling. Air slips are now fairly common on the heavy rigs and, although some operators disagree, most feel that the safety features and labor saving of the air slips result in an over-all increase in rig efficiency which will justify the cost of power slips.

As previously mentioned in the jet-bit discussion, rotary-table torque indicators are an aid in determining the time to pull a bit. An increasing number of rigs are being equipped with some type of torque indicator, either a vacuum gauge in the case of gas engines, or a rotary chain tension indicator for diesel powered rigs.

The drilling feed-off control or so-called automatic driller has proved to be a valuable aid in increasing penetration rates and thereby reducing drilling costs. A recent survey indicated that there were 67 rigs operating in West Texas with some type of feed control. Most of the controls are used on rigs rated as 9000 feet or deeper, and inasmuch as there are approximately 300 rigs of that size in West Texas, some 22 percent of the heavy rigs utilize the drilling-feed control. One good comparison of rigs using the drilling-feed control occurred in the Yarbrough and Allen field. Eleven wells drilled over a two-year period were compared. All used essentially the same drilling practice with the exception that six were drilled by rigs without feed controls and five by rigs with a drilling-feed control. The five wells drilled by rigs with feed controls averaged 276 rotating hours less per well than the average of the six wells drilled without feed controls, which amounted to a reduction of 18 percent in rotating time. A reduction in rotating time of this order certainly justifies the cost of a feed control. In addition to the reduction in rotating time, a minimum of twist-offs and crooked-hole difficulty was experienced by the rigs using the feed-off device.

The interest in automatic pipe-handling equipment is increasing. Several air-powered drill-pipe spinning tongs are now in use and automatic catheads are used practically universally. Humble's automatic rig has been in operation in West Texas for over a year; and although continued development with the equipment is necessary for it to replace conventional equipment, the equipment does handle pipe as fast and is capable of handling pipe faster than conventional equipment. The pipe is handled with a minimum of effort and offers a very safe method of handling drill pipe because no catheads are used and no personnel are near the drill pipe. Continued development of equipment of this type should enable the drilling industry to offer workers the opportunity of working until normal retirement, which might relieve a growing labor problem in the industry as well as allow the industry to profit by being able to work more experienced personnel.

Results of Improved Drilling Practice. In the Yarbrough and Allen field, some 60 wells have been drilled by several operators. In mid-1951 the Humble Oil and Refining Company initiated a program to reduce drill and complete time and total well cost in the field. At that time Humble had drilled 20 wells with an average completion time for normal field wells of 110 days. The following practices were initiated: oversize drill collars, jet rock bits, reduced rotary speeds, chert bits, and predrilled mouse and rat holes to reduce spudding time. The two rigs used are equipped with drilling-feed controls and are unitized for skidding and are able to skid and set surface pipe in less than 24 hours. The results of this program have been encouraging. The record time for the field was lowered to 94, 86 and 81, and on the latest well to 70 days total time from skid to skid. The best completion time reported by other operators is 98 days, with an average time of from 100 to 110 days. The combination of drilling practices used makes the evaluation of any particular item difficult, but the over-all reduction certainly indicates the advantages that can be gained through improvements in drilling practice.

Future Trends in Drilling. There are some definite trends in West Texas drilling operations that appear to prognosticate future drilling practices and equipment. One of the most probable is the use of air or gas as a

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circulating medium. Remarkable results have been obtained, mostly in the San Juan Basin of New Mexico; and with an estimated 20 percent of the West Texas footage capable of being drilled with a gaseous medium, progress in this field is certain to advance. There are numerous indications of equipment changes: larger drill pipe; maximum-size drill collars in known areas and maximum to wash over in other areas; maximum-bore collars to reduce hydraulic losses; extensive use of jet-type bits; power pumps with greater horsepower; gas engines with more horsepower; and a tendency away from diesel engines because of the low cost of butane; an increasing use of air-powered automatic equipment and automatic drilling-feed controls.

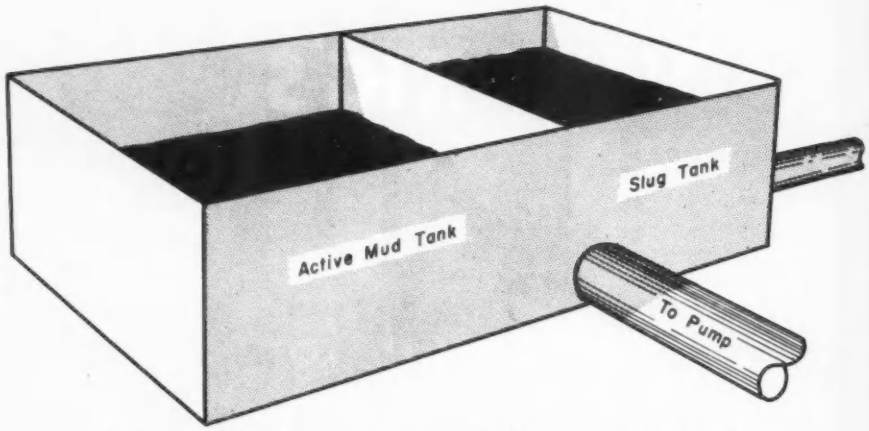
Wells have been drilled to depths of over 15,000 feet in the area, and deeper tests are not far in the future. Abnormal pressures, although not as great as coastal pressures, have been encountered which will necessitate some revision in the usual West Texas casing program. To control any abnormal pressure in West Texas, it is necessary to have a string of casing set through the usual lost-circulation zones. In the deeper areas, this would require from 10,000 to 12,000 feet of casing. The cost of drilling a 12¼-inch hole to set 9⅝-inch casing or an 11-inch hole to set 8⅝-inch casing at these depths would be practically prohibitive. It seems likely that future deep tests will carry 8¾-inch hole, and if a deep protective string is needed, will use 7⅝-inch slim hole or 7-inch casing and drill to total depth with a hole size from 6¾ to 6-inch. It is common practice in the West Texas area to set 5½-inch casing in 6¾-inch hole; and it is possible to set 5-inch casing in 6-inch hole.

Needless to say, the future drilling practices in West Texas will be interesting and reductions in drilling time and cost will be made. The drilling industry has been, and will continue to be, progressive as long as the present healthy competition exists. With the majority of the West Texas area yet to be explored, and with some 500 rigs competing in the area, progress in hard-rock drilling will continue.

ACKNOWLEDGMENT

This paper was presented at the Spring Meeting of Southwestern District Division of Production, API, in Fort Worth, Texas, March 4-6.

(Second of Two Parts)



This sketch shows how slug tank is adaptable to standard mud tank.

Here's How to Pull a Dry Pipe . . . and Save Money

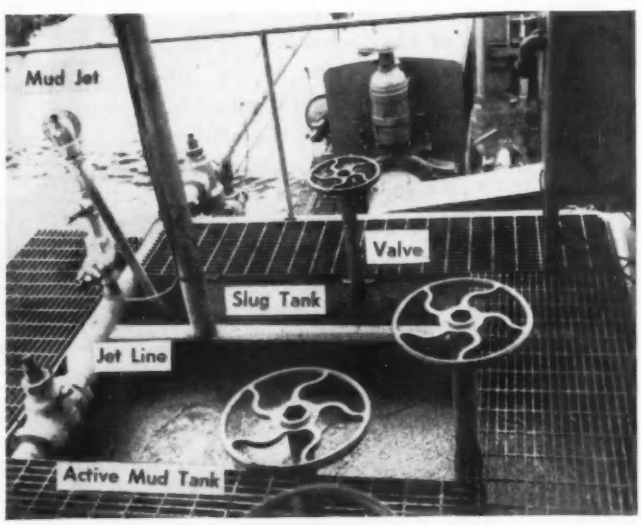
SLUG TANKS built into the active mud tanks of many drilling barges are saving money for contractors. Built on the extremity of the active mud tank, this auxiliary tank is made by partitioning a 30-barrel volume out of the active mud tank to hold a heavier mud.

There are not many jobs as disagreeable as that of pulling a wet string of drill pipe on cold days. So, one contractor has devised a method in which pipe always will be pulled dry. The process is as follows: By mixing 20 barrels of weighted mud to a consistency of 1 or 2 pounds above the weight of the active mud, it may be pumped into the drill pipe just prior to making a round trip and will assure dry pipe. The heavy mud displacing the lighter mud will equalize the fluid level below the derrick floor, resulting in pulling a dry string.

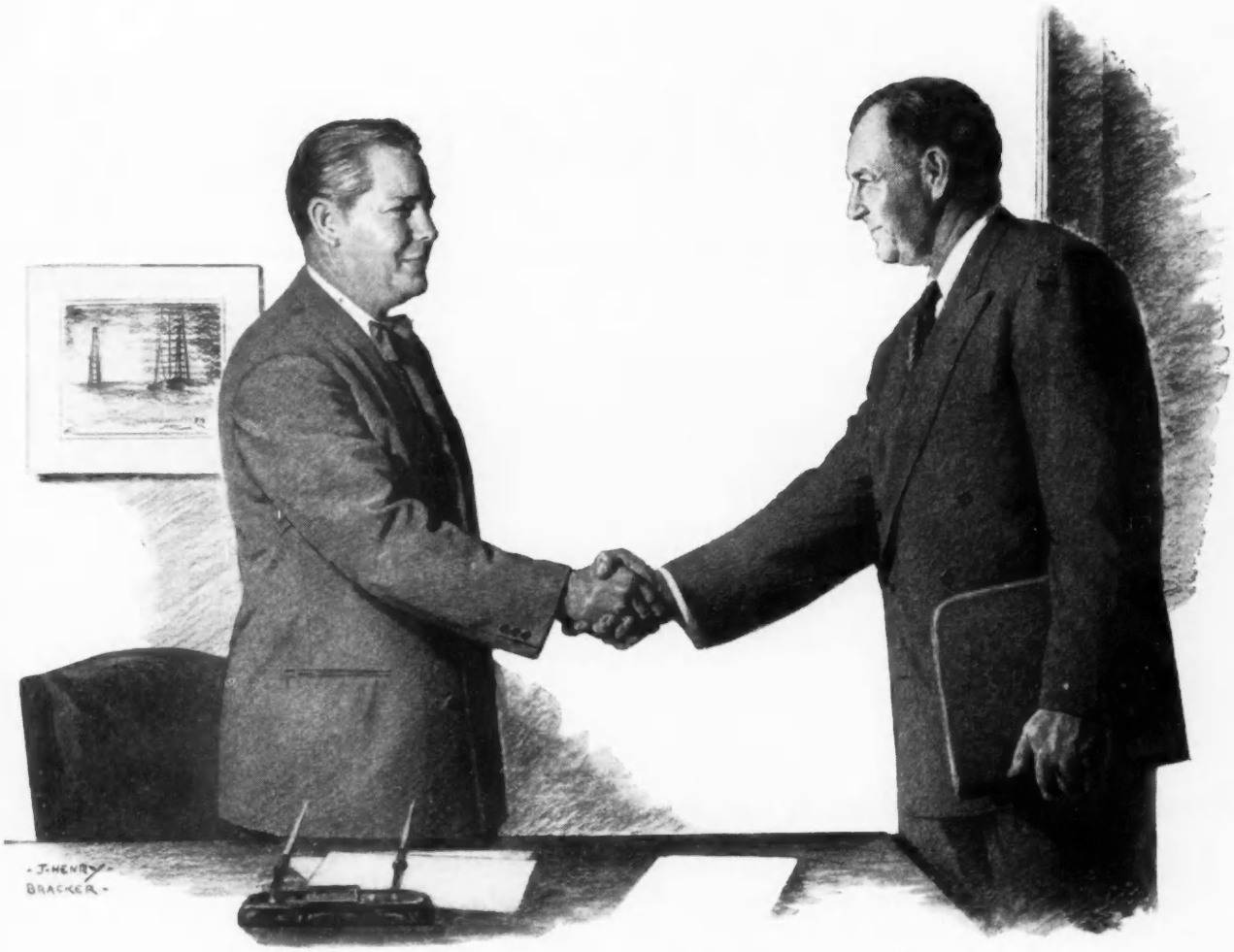
By knowing the capacity of the mud pump and the volumes of the mud needed, this tank may serve as a method to spot loss circulation material. This offers many advantages since the active mud pit is not contaminated with loss circulation material, and after the material has been spotted, normal mud may be utilized by a simple switching of valves.

Its applications are many. Some operators have used it to kill wells, to spot water, or to put oil in a system where you want to displace mud with oil or vice versa. Its most general use, however, is that of a slug tank which provides great savings for the operator.

On the Gulf Coast, where special expensive muds are widely used, it is not uncommon to find mud bills running as high as $10 to $20 per barrel. Frequently, as much as 20 to 50 barrels of special mud have been lost each trip from pulling wet strings. The slugging tank prevents this waste. A few such savings will pay for installations.



The trick is to weigh up mud in slug tank and pump into drill pipe prior to making a trip. Weighted mud tends to force lighter mud down, equalizing fluid level below derrick floor.



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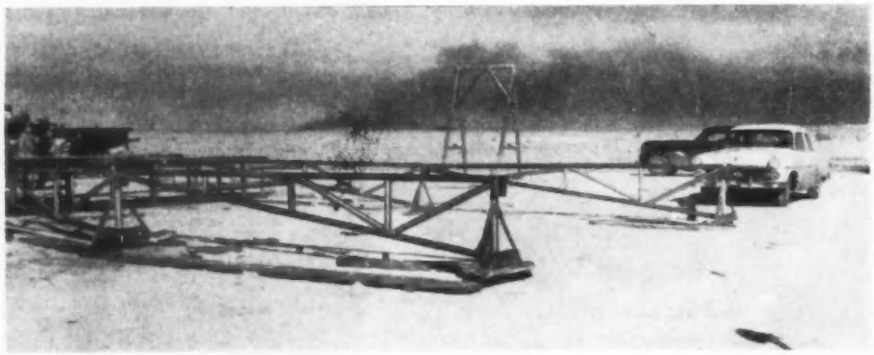

FIGURE 1.

Bed Rail Pipe Rack Is Demountable

A special type of light, demountable pipe rack, which differs from other types used in conventional rig work, has been devised. The feature of this rack is that each section of the rack is an exact duplicate of the remainder, and may be used at any point in the assembly.

Make the sections of pipe and angle iron with wedge-type locking devices which resemble the fixtures attached to the ends of bed rails. The shape of the section is a right angle triangle with a short base, and a long side and hypotenuse.

Set the base in a vertical position resting on a long piece of heavy angle iron securely attached with angle iron diagonal braces. A heavy wedge attached to the vertex of the triangle fits into the locking device which in turn is welded to the top of the post, forming the base of the triangle. Attach similar wedge locks to sides of the pipe walk so that the rack may be extended on both sides to accommodate the amount of pipe and tubing necessary for operations.

FIGURE 2.

Figure 1 shows the complete pipe rack assembly setup. Details of the single section are shown in Figure 2.

Chain Gate Is Trespass-Proof in Drilling Area

A chain gate can be used on each closely spaced location in an area of "tight hole" drilling to prevent indiscriminate entry of public automobiles. Make the main barricade, or fence, of horizontal pipe and support it at intervals by risers set in concrete. At each opening in this fence place the chain gate. Permanently anchor the chain to a heavy bar welded in a vertical position inside the open end of the pipe (Figure 1). Attach the opposite end of the chain to an eye bolt welded to a similar bar, but reinforce the chain at the base with a narrow strip of heavy metal. The lower end of this bar sets into a hole cut into the pipe above the riser.

FIGURE 1.

FIGURE 2.

Slots through the top of the horizontal pipe should be shaped so that the anchor bar, or closing piece, can be inserted easily, but requiring an

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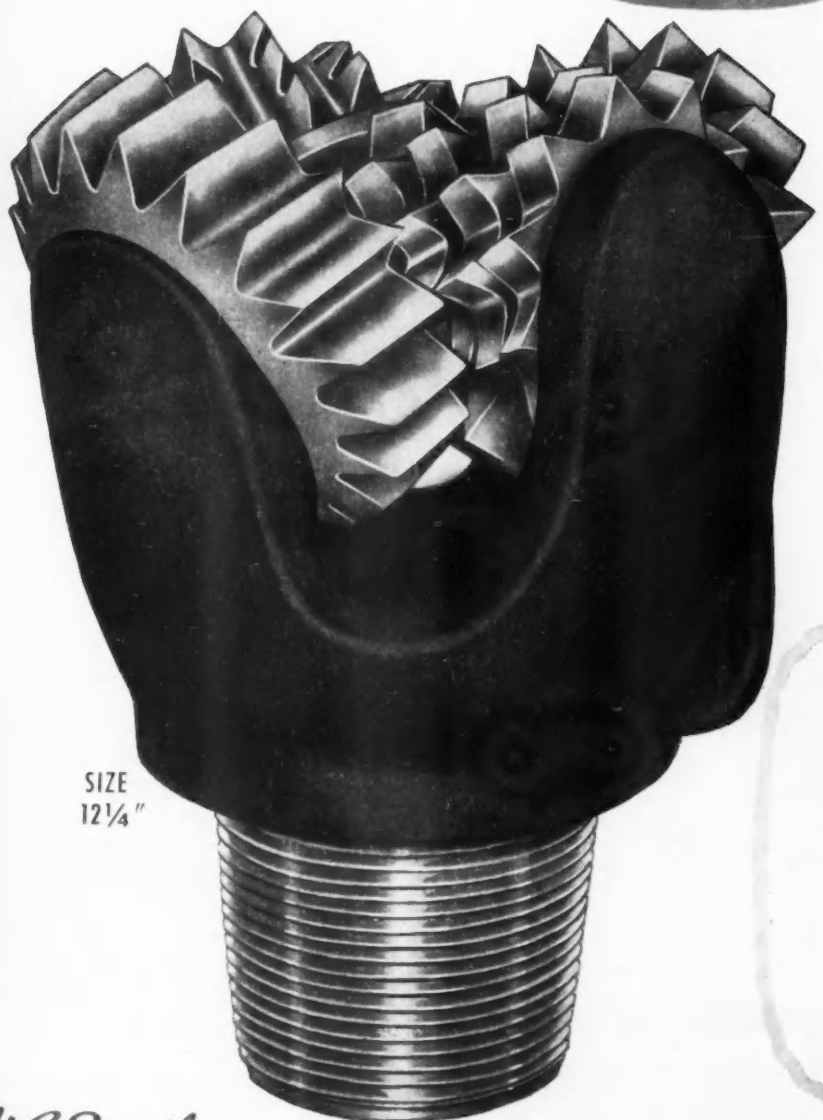

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For complete details of Foster Air Controlled Catheads see pages 1758, 1759 and 1769 in the Composite Catalog.

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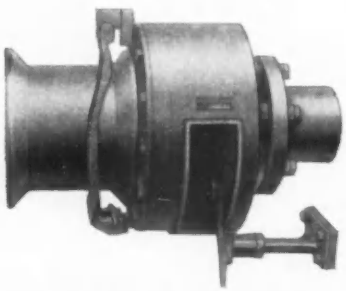

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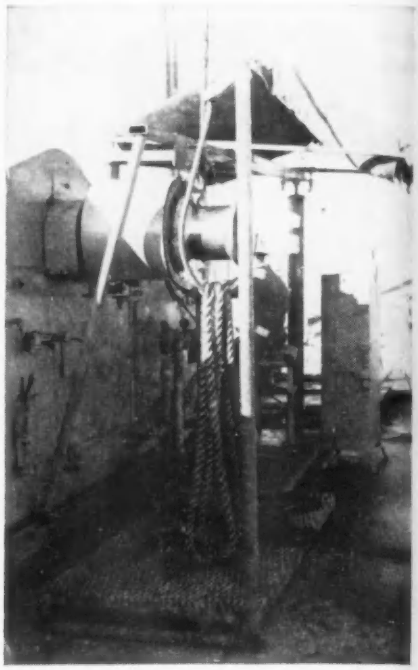
extension to bring it back and into a notch.

While anyone can open this chain gate with a suitable lever, no one will try to lower the chain because of the difficulty of obtaining a suitable lever. Figure 2 shows a view of the locking device at the free end of the chain.



Storage Hook Protects Expensive Cat Rope

Since cordage is expensive, anything that can be done to lengthen the life of a catline will pay dividends. Therefore, a ventilated platform to support the storage hook also will provide a dry floor for the loose ends of the line.

The accompanying illustration shows a frame of pipe used to hold a floor of expanded metal lath, or similar material, only a few inches above the derrick floor itself, which can be placed at any desirable position convenient to the cathead. A davit type crane welded to one corner carries a more or less conventional hook upon which the cable can be looped. To provide less occupied space when moving, the vertical post of the crane might be set firmly into a socket, or screwed into a collar welded to the most convenient corner of the pipe fabricated floor frame.

At any rate, the expanded metal lath floor provides adequate drainage and quick drying of the catline when splattered with drilling mud or wet when washing the floor after a round trip.

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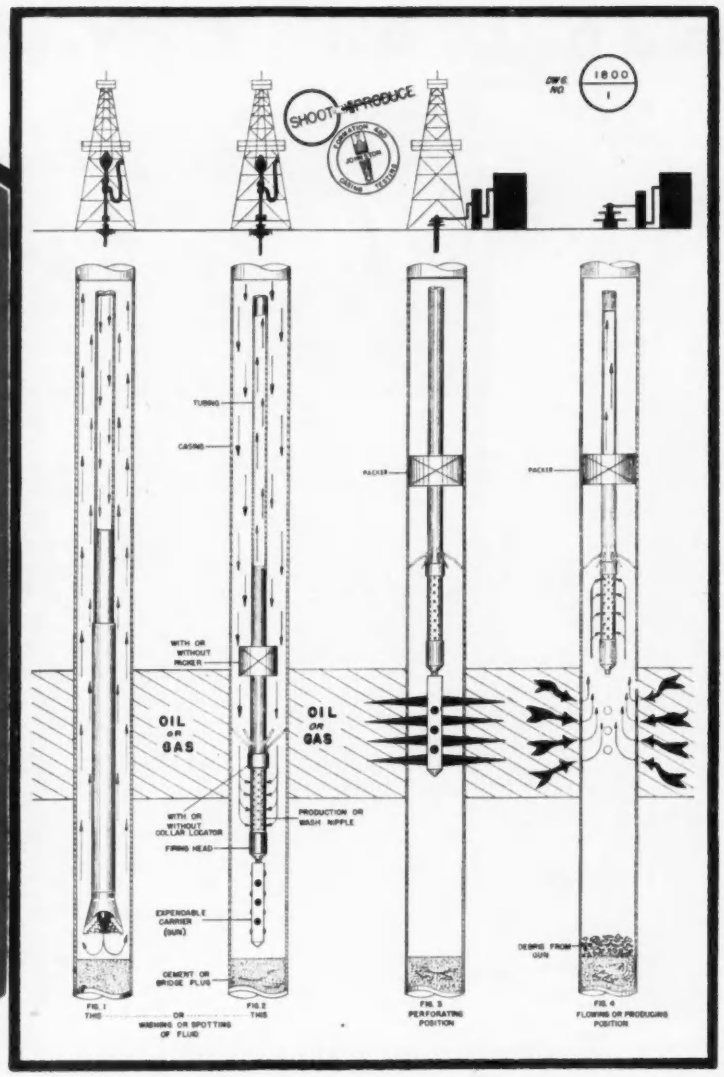

• With the Johnston Shoot and Produce equipment it is possible to lower hydrostatic pressure below reservoir pressure and position the desired fluid opposite the reservoir with the Christmas Tree and surface connections completed and the well fully under control before perforating.

Drawing No. 1800-1 shows the procedure used in the Shoot and Produce method. Fig. 1 shows casing has been cemented; the "Running-In-String" used for drilling and cleaning out to bottom can be used for displacing drilling mud with other fluids as oil and water, or spotting these fluids before pulling it to the surface. Fig. 2 shows a second method, with the Expendable Gun, Firing Head, Perforated Nipple, with or without Collar Locator, and with or without Production Packer in position for locating collars and displacing drilling mud with desirable fluids, or spotting other fluids. Fig. 3 shows perforating equipment in position, with or without packer, and Christmas Tree and surface equipment fully installed. The well is perforated by dropping the "Go-Devil" which shears Disc in Firing Head and exposes hydrostatic fluid pressure to piston in Firing Head which detonates the Expendable Gun. Fig. 4 shows production string and surface connections after perforation, with the well free to produce and debris on bottom.

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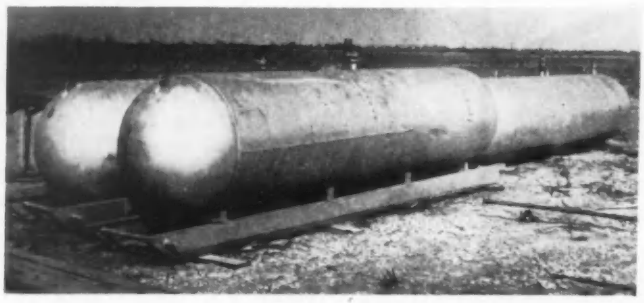

Long skid-mounted horizontal type propane and butane tanks used for drilling rig fuel are seen frequently along the Gulf Coast. Designed to offer maximum support to the tank, the skids are made of 6- to 8-inch channel or I beam steel which has been welded in the shape of a sled to provide for convenience of loading and unloading.

The tanks, which are welded to the skid by short sections of steel, are rigidly supported and offer an easy method of transporting fuel to and from distant rig locations. The tanks may be easily winched onto the back of trucks and carried to the next location.

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The main part of the assembly is a triangular pipe frame welded from two-inch pipe with tee shaped ends for a base which allows the stand to remain erect. The saddle for ram No. 1 is a two-inch short nipple welded horizontally at the apex of the triangular frame. Ram No. 2 is placed in a two-inch collar welded to the right side of the triangle midway between the apex and the base. The master valve is attached to the left side of the support in the same manner.

The assembly is painted red and all three valve wheels are labeled plainly. This arrangement makes it easy for each tour to check and keep in perfect working order, assuring proper function at the time of emergency.

First

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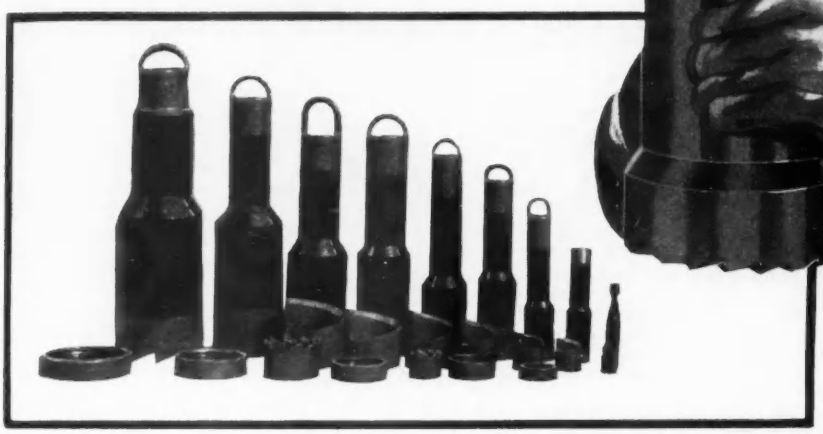

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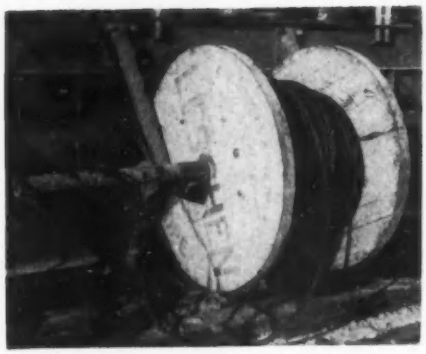
Spool Is Attached To Rig Substructure

A wire line spool bracket can be bolted directly to the top and bottom sills of the rig substructure. Make it of pipe with the widespread legs fitted with plates that fit into the structural steel beams. The apex of the triangles formed by the bracket legs carry horizontal pipe nipples which support saddles into which the "axle" is placed permitting rotation of the spool of wire line. As the bracket is more or less permanent, it will move along with the rig when skidding so that the spool of wire line need not be removed.

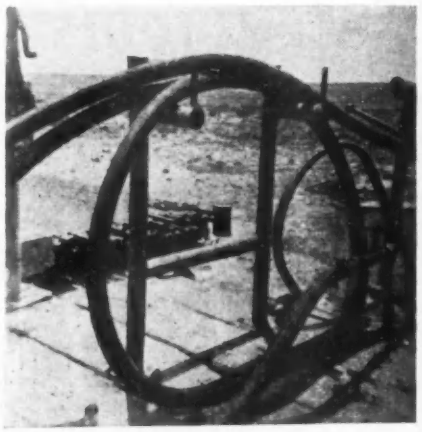


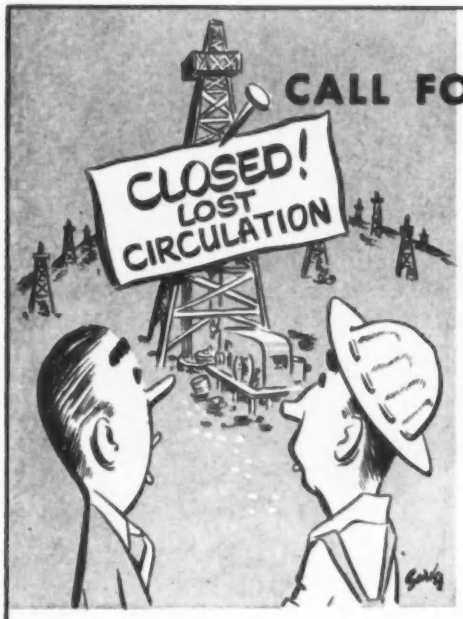
Rack Is Safe Place For Washdown Hose

The problem of placing the wash down hose in a safe position on the drilling rig can be solved by constructing a hose rack similar to the one illustrated.

This rack, consisting of six lengths of pipe and two lengths of small rod or tubing, can be constructed as part of the safety railing, thus serving two purposes.

Two three-foot lengths of two-inch pipe serve as uprights and are bolted to the derrick floor by steel base plates, made from one-half-inch steel sheets six inches square. A two-inch pipe welded horizontally between the two uprights at a point below the halfway mark, acts as a brace. Two two-inch nipples six inches long with a one-half-inch bolt welded in the end, are welded as hangers for the hose in a plane perpendicular to the brace.





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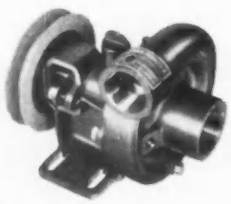

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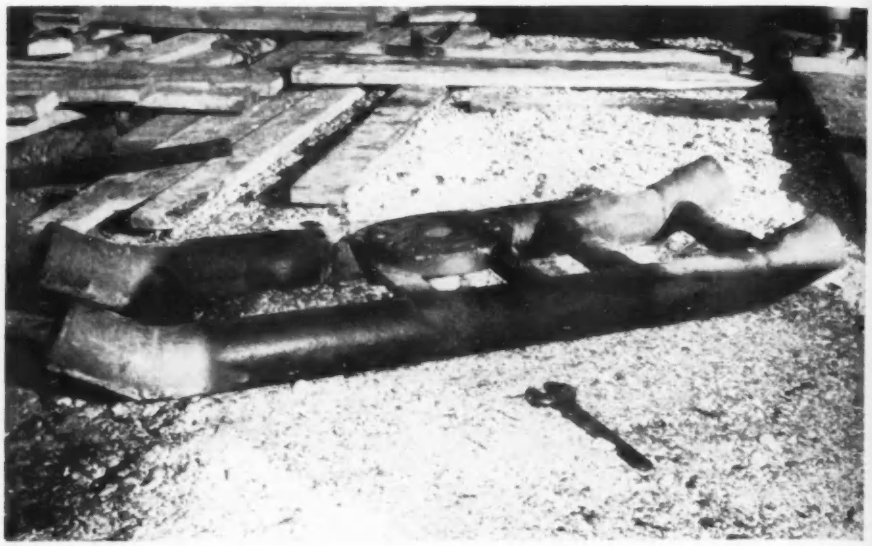

Skid Eliminates Wear on Equipment

Ponderous blow-out preventer equipment must be given preventive maintenance or it may fail when urgently needed. One contractor has designed a skid which eliminates a great deal of wear on valuable equipment.

The skid is given a center mounted flange which is welded to the cross-braces between two runners. The blow-out preventer is subsequently bolted to this flange and mounted in an upright position. The threads are thereafter protected and frequently oiled so that the studs may be inserted with the minimum of effort.

Damage to the preventer head and ring seal are avoided during moves when the equipment is mounted as shown because it is moved as a compact, protected unit and not dragged haphazardly into position by a winch truck.

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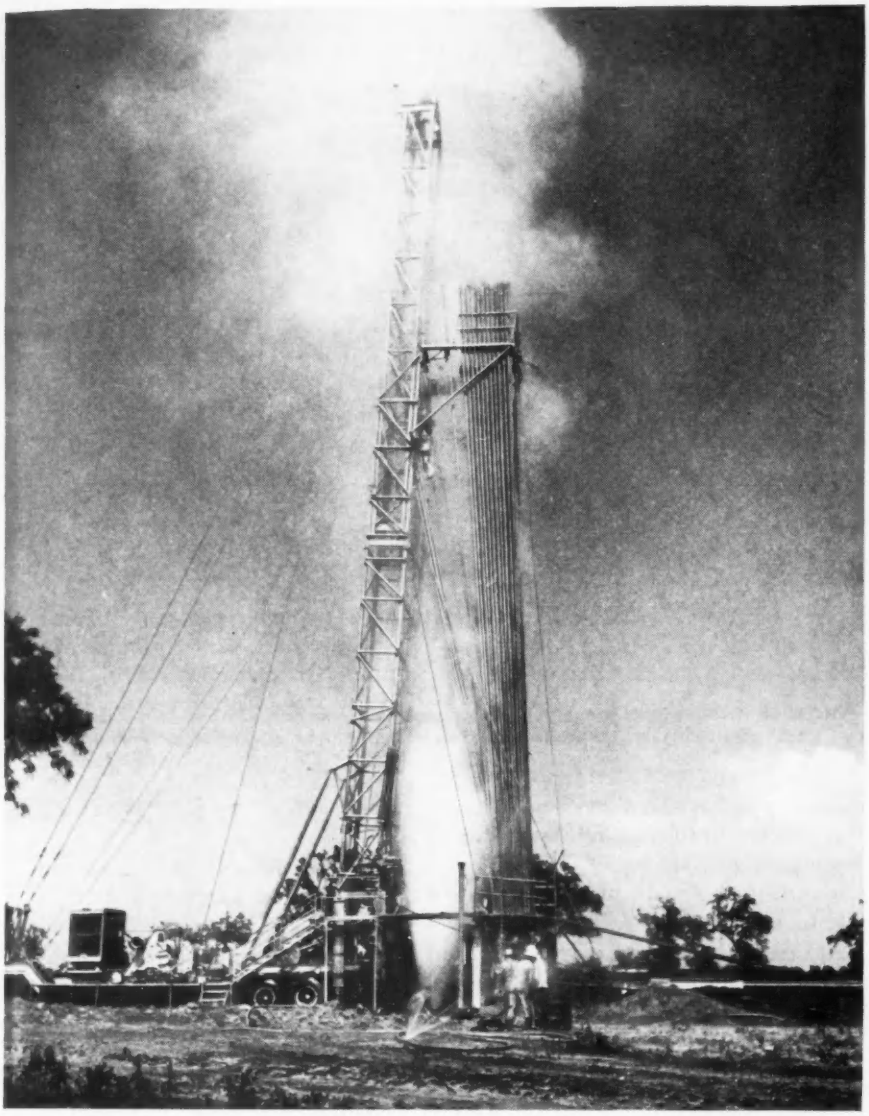


A number of blowouts or near blowouts have been caused directly by faulty flange seals. Best equipment available plus periodic tests will insure protection against such disasters.

Field Testing Can Prevent Flange Leaks

Here are some facts on what makes ring joints seal and the effect of erosion and corrosion.

By MARVIN R. JONES and FRANK N. BALDWIN, JR.
Petroleum Mechanical Development Company, Houston

TESTING AND INSPECTING christmas trees and drilling hookups in the field has proved invaluable to operators by discovering various types of deterioration to the flange seal. Left unchecked, such deterioration probably would have caused disastrous results. Vulnerable and favorite spots for deterioration attacks are in the flanged connections of well head assemblies and drilling hookups. More particularly, the gaskets in these connections seem to receive the main force of attacks. The logical way to determine the presence of any deterioration is through a systematic program of periodic on-the-spot inspection and testing.

Deterioration of flanged connections in general may be broken down into various forms, the most prevalent of which are erosion and corrosion. Usually both are present, and the combined effect seems considerably greater than the sum of their independent actions. Corrosion engineers have said there is no definite dividing line between corrosive wells and non-corrosive wells. That all wells are corrosive and the difference is only a matter of degree.

After a tree is installed and the well brought in, the flanged connections must be assumed to deteriorate constantly. Such deterioration as ensues will operate to reduce the capacity and reliability of the joint by affecting finishes, areas and loadings. At best, the interior condition of the connections at any one point of time is extremely uncertain since deterioration takes place gradually, the rate being controlled by the character of the fluid.

Flanged connections of drilling rig blowout preventer hookups also are not free from the detrimental effects of corrosive action. Other factors contributing to deterioration include mechanical loadings, vibrations and the making and breaking of such joints.

Several companies operating in fields of known high corrosive and erosive rates have instituted periodic inspection programs to determine the general interior conditions of the trees. Program of one company is to alternately close off one wing of the tree and carefully inspect connections on the down side of the wing valve for deterioration. Parts are replaced if found to be defective or questionable. This procedure is followed once each month on each tree. Every six months each well is shut in and the tree from the master valve up is dismantled and closely inspected. Wells are alternated so that no more than one well is shut in at any one time. This program does not include inspection of the tree below the master valve, but it is thought completely impractical, except in emergencies, to kill the well for inspection of these parts.

Programs for pressure testing drilling control assemblies have been introduced by several oil companies and

independent contractors. General procedure includes flange and gasket inspection when the joints are broken open, operating tests at frequent regular intervals, and hydrostatic pressure tests.

Most pressure tests on these hookups are made by lowering through the preventers and into the casing a joint of drill pipe having a packer on its lower end. Rams of the uppermost preventer are closed on the pipe and pressure is applied to the annular volume between the pipe and the preventers. Field pressures are limited to the maximum desirable pressure which may be applied to the casing, but even these low pressures detect many leaks which might otherwise escape notice.

As yet, no programs of testing tree connections of producing wells are known. Many manufacturers provide test ports in the bottom of the tubing head flange for testing tubing head seals on the production string of casing and for testing the casing head-tubing head joint. This test is performed after installation of the tubing head and the same test could be repeated at any desired later date.

The casing head-tubing head bonnet connection is a particularly vulnerable joint in the christmas tree chain, since it necessarily is always made up in the field. Generally, field joints are made up under conditions far from ideal, and test ports for pressure testing this particular joint are not usually provided. The usual procedure is to make up the joint reasonably tight. If it leaks, bolt tightening is continued until it stops leaking.

This situation presents an inconsistency which sometimes develops into a serious problem. When a tubing pressure of 2000 to 3000 pounds per square inch is indicated by drill stem tests, the operator will order a Series 900 tree. Shop-made joints are tested to 6000 psi, but as indicated above the field-made joints are made to hold only working pressure of perhaps 2300 psi or 2400 psi. Certainly this joint holds the 2300 or 2400 psi, but how much more will it hold? The tree was tested in the shop under ideal conditions at 6000 psi, but the field-made joint is the weak spot. No chain is stronger than its weakest link. Some method should be employed in the field to test this joint to 6000 psi.

Effects of corrosion on a flange joint ring gasket are shown here. At one point (arrow) corrosion has eaten nearly into the sealing area. Inspection in this case prevented a costly repair job.

Seal Mechanics. A satisfactory seal between two flanges can be said to be one which will effectively hold fluid without leakage at all pressures from zero to full rated test pressure, with any anticipated fluid at any anticipated temperature. The ideal seal would last forever under any effects of deterioration. The best seal humanly possible is one which comes close to the above requirements for the particular installation and maintains its effectiveness over the longest period of time.

The American Petroleum Institute prescribes standards to be maintained in the grooves and gaskets of ring joint flanges. Figure 1 shows the typical proportions of such a groove. Figures 2 and 3 show respectively the oval and octagonal shaped gaskets. The oval type is most commonly used in field practice except in the 2900 Series where octagonal gaskets are used exclusively.

Tapering sides of the groove (Figure 1) are finished smoothly to engage the surface of the gasket. A positive clearance is provided at the bottom of the groove in order to allow adequate makeup on the seating surfaces.

It is intended that the flange be substantially harder than the gasket,

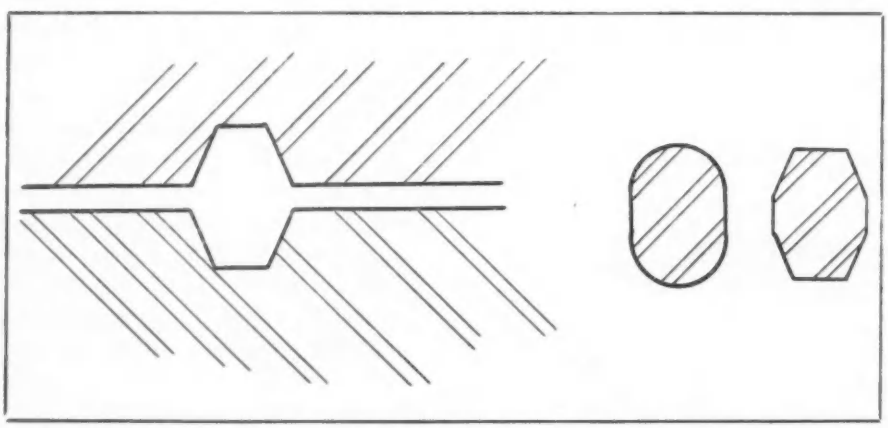


FIGURE 1 (left). Typical proportions of API flange groove.
FIGURE 2 (center). Cross-section of oval-shaped ring gasket.
FIGURE 3 (right). Cross-section of octagonal-shaped ring gasket most commonly used in the 2900 series flanges.

and although the standards do not specify hardness values, they are to some extent implied by requirements for other physical properties. For the most common sizes used in drilling and production, a minimum yield strength of 60,000 psi is specified, and this indicates a minimum hardness of somewhere around 180 Brinell.

Material for the gaskets is specified to be of a material suitable for the service. It is recommended that the gasket material be softer than flange material. Actual experience has indicated that the mild steel gasket having a Brinell hardness of not more than 100 is generally most satisfactory.

In order to establish a seal it is necessary to deform the surfaces of flange and gasket in contact so that whatever passageways are left are too small to permit fluid penetration. This is accomplished by initial tightening on the bolting to a degree sufficient to produce the necessary contact. Under this loading, the bolts exert a force pulling the flanges together and the gasket exerts an equal force holding them apart.

Two important physical factors operate to vary the ease with which a seal can be obtained. These factors are quality of surface finish on the mating parts and the relation between pitch diameters of the gasket and the groove. The surface finish of mating parts should conform to a smoothness of 16 (A.S.A. recommended standards), and certainly be free from any nicks, chatter marks or other imperfections. When the pitch diameter of the gasket is large with respect to the groove pitch diameter, a seal is more readily obtained than when the gasket pitch diameter is small with respect to the groove pitch diameter.

Atmospheric temperature, in addition to deteriorative action affects the sealing efficiency of gaskets in flanged connections. Several years ago one producer had an experience involving a casing head having a 10-inch Series 1500 flanged connection with the tubing head directly above it. This was an untested joint made up in the field and at the time of completion, there was pressure on the oil string of about 2000 psi. The joint leaked. Several rounds of tightening of the bolting stopped the leak. Tightening was done at a temperature of about 34° Fahrenheit. During the following summer a serious leak in this joint was discovered by an off-duty employe and it was stopped only by extreme bolt tightening. Here, except for a fortunate incident, a relatively small temperature change could have been in part responsible for extensive damage.

About the Authors

MARVIN R. JONES is president of the Petroleum Mechanical Development Company which he helped form in 1949. He received his mechanical engineering training at the University of Oklahoma and is a registered mechanical engineer in the State of Texas. He is a member of the Houston Engineers Club, the ASME, and the Houston Chapter of API. He has had wide experience in oil tool design, and was formerly chief engineer for the Oil Center Tool Company from which he resigned to organize Petromec.

Marvin R. Jones

FRANK N. BALDWIN, JR., is vice president of Petroleum Mechanical Development Company. He joined the company early in 1950 shortly after its formation. He received his bachelor's degree in mechanical engineering from Texas A. & M. College, and is a registered mechanical engineer in Texas. He is a member of the Houston Engineers Club and the Houston Chapter of API. For two years prior to joining Petromec, he served as a sales and service engineer with Oil Center Tool Company.

F. N. Baldwin, Jr.

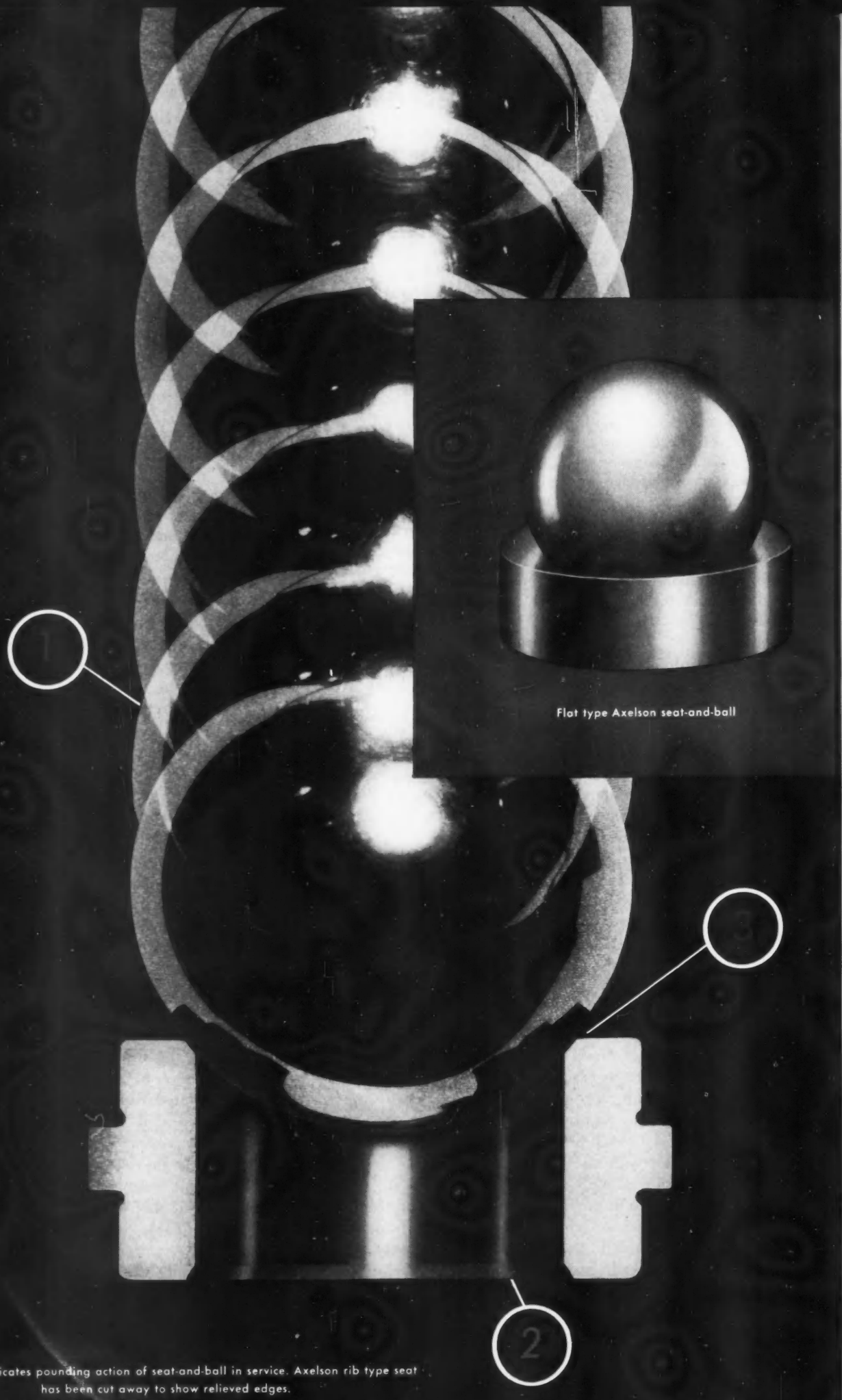
Bolt Tension. Bolt tension is another factor affecting the sealing ability of a flanged joint. Oddly enough, there is no direct relationship between the pressure a joint will hold with different gaskets and the bolt loading. On one test recently observed, a joint with one gasket held well over 2000 psi with bolting made up with 50 foot pounds of torque. With another gasket, apparently identical, 550 foot pounds would not produce a seal able to hold 100 psi without leaking. About the only conclusion possible is that more danger exists as a result of under tightening than is the case with overtightening.

Secondary Seals. To dispel any uncertainty of obtaining an effective seal and to combat effects of corrosion, various types of secondary seals have been provided. These seals have proven to be satisfactory and effective aids in maintaining pressure-tight joints.

Two types made of resilient materials have been widely successful. Each type is ring shaped, the ring diameter being smaller than that of the steel gasket. One includes a spring steel wire retainer and the other depends upon its cross-section to prevent displacement. Both form a reliable, high capacity, interference type seal against the faces of the flanges as they are bolted together. Often it is desirable to use a seal of this type outside the gasket as well as inside.

Another type recently introduced is part of the steel gasket. Resilient material is molded onto the steel gasket and when the flanges are bolted together, a resilient secondary seal in the bottom of the groove is obtained concurrently with the standard steel seal. Also provided are resilient beads on the inner and outer sides of the gasket to seal off both gasket and groove from corrosive fluids in the well and deteriorating action from the outside.

In the over-all picture the safest and most economical practice is to use the best shop-tested flanged equipment available, utilizing secondary seals as sealing insurance, and maintain an effective program of inspection. Considerable thought should be given to a practical means of testing to full test pressure those joints already in service.



Flat type Axelson seat-and-ball

Photogram indicates pounding action of seat-and-ball in service. Axelson rib type seat has been cut away to show relieved edges.

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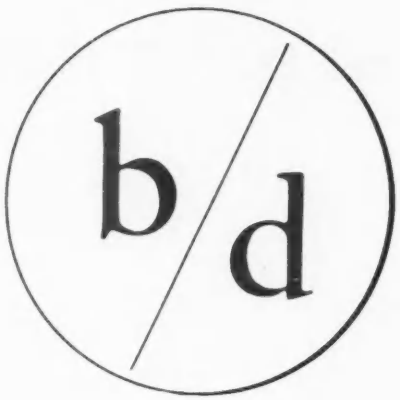

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3. Axelson goes an important step further; both edges of the mating surface are relieved. This prevents formation of burrs under the pounding action of the ball, protecting the seat from fluid cutting, the ball from sharply concentrated pitting forces.

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Brine Corrosion of Steel Vessels

By CECIL O. SMITH
The Carter Oil Company, Tulsa, Okla.

CORROSION DAMAGE to steel vessels handling oil-field brines can be reduced greatly, with consequent savings in operating expense, by cathodically protecting the exposed interior surfaces. Experiments were conducted in two types of brine produced in central Kansas, in an effort to establish a better definition of protection requirements, and a measurable index of the degree of protection was obtained. Data as interpreted indicate that an electrical potential of approximately one volt, between the steel vessel and a copper-copper sulfate electrode in the brine, defines protection in brines tested. Estimated protection cost, derived from experience at 15 anode installations in Kansas, will average less than $3 per tank-month.

Until fairly recent years, deterioration of certain oil-producing equipment by the corrosive action of brine was more or less accepted as a problem normal to routine operations. In many cases, damage and repair costs from this form of corrosion have amounted to a significant fraction of the cost of producing oil. Emulsion treaters, settling or wash tanks and vessels in salt-water disposal and water-flood systems are particularly vulnerable to damage by brine. In extremely corrosive environments, tanks and treaters are seriously damaged within as little as three years after installation. Repairs are but a temporary measure, with repair frequency normally increasing until the vessel must be replaced. At the same time several factors such at portability, cost, and ease of installation favor the continued use of steel vessels.

Within the past few years, cathodic protection was provided by placing magnesium anodes in brine vessels to reduce corrosion damage significantly.

Causes of Corrosion. As produced, brines may be acid, neutral or alkaline. Brines containing hydrogen sulfide or carbon dioxide are corrosive because of the weak acids formed by the gas in solution. Dissolved oxygen in brine accelerates corrosive action.

Effect of corrosive action will appear either as localized pitting or as uniform dissolution of steel, or both. Pitting is the more serious of the two forms, because penetration rates can be very rapid. Mill scale, abrasions, recessed areas, sharp edges and areas of excessive stress foster localized pitting, which is the dominant form of attack in an aerated, neutral or alkaline brine. Uniform attack ordinarily occurs in acidic brines.

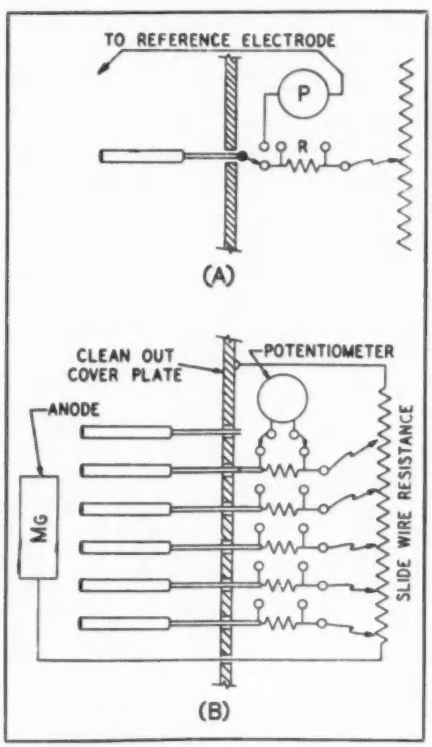
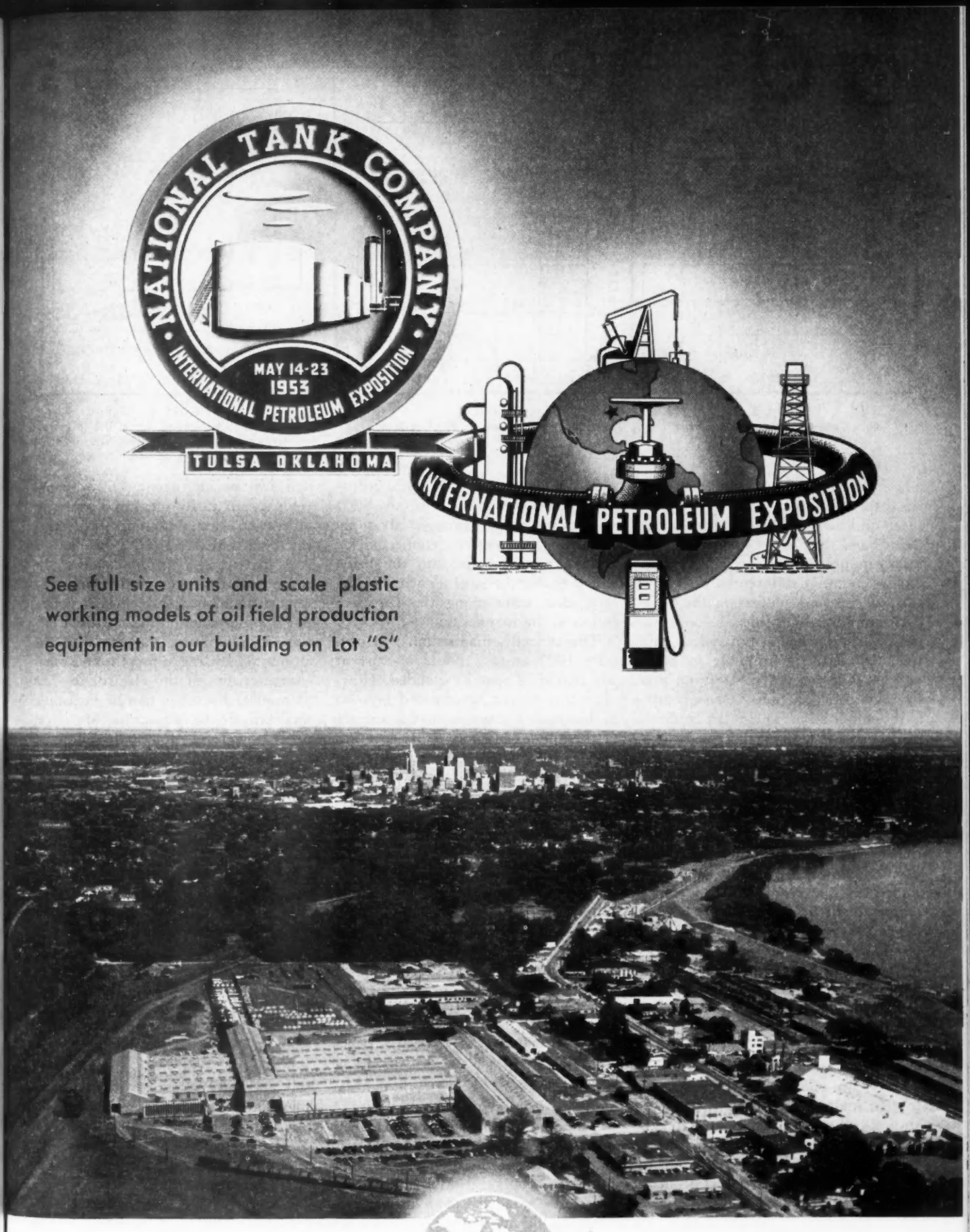


FIGURE 1.
Circuit diagram.

When a piece of mild steel is immersed in brine, a fundamental reaction occurs in which the iron tends to displace the hydrogen ions of the solution. This reaction is in accordance with the relative positions of the two elements in the electrochemical series. The rate of initial ion displacement is primarily influenced by the hydrogen ion activity of the brine solution. The metal surface is not uniformly reactive; therefore, the rate of ion displacement is not uniform over the surface area.

Localized areas having the greatest ion activity initially, develop a slight positive, anodic potential with respect to less active, cathodic areas. One result of this potential difference is that hydrogen moves through the brine to the cathodic area, where it plates out on the surface of the steel. This accumulating layer of hydrogen, unless disturbed or removed, retards the rate of current flow because it increases the effective resistance of the current path. Presence or absence of the protective film of hydrogen influences the corrosion rate of steel more than any other single factor.

There are a number of conditions prevalent in oil-field brine systems that contribute to the removal of the hydrogen film. Dissolved oxygen, if present, will combine with the hydrogen to form water. Turbulent fluid, high fluid velocities or the abrasive action of moving parts may destroy the film. Any action, either chemical or mechanical, that destroys the protective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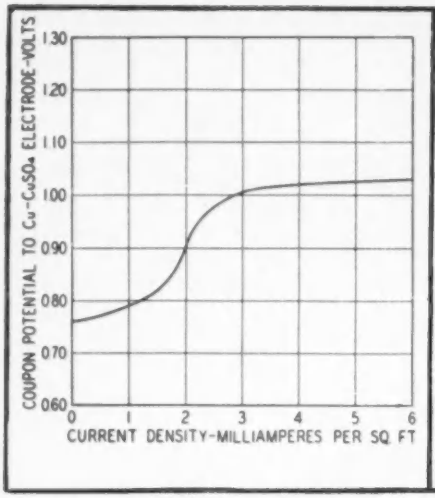

FIGURE 2.
Coupon potential vs. current density.

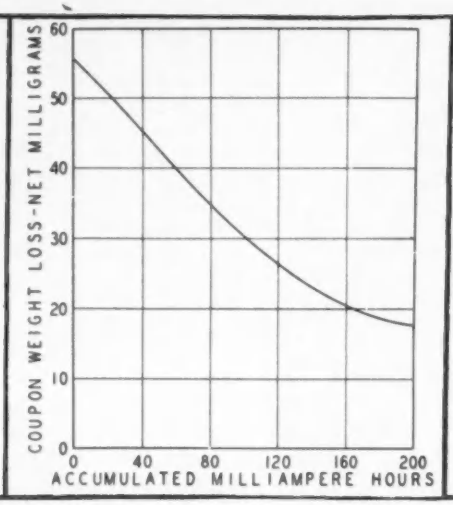

FIGURE 3.
Coupon weight loss vs. total current.

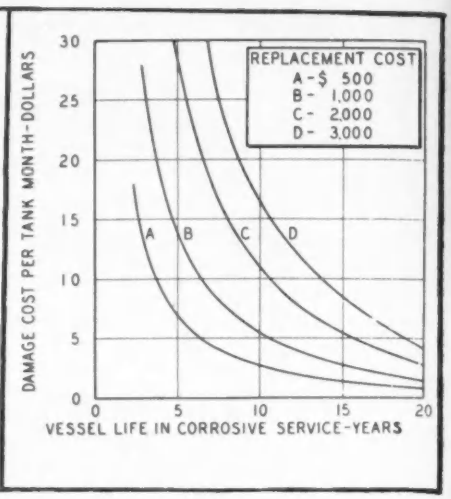

FIGURE 4.
Corrosion damage costs vs. vessel life in corrosive service, based on 30-year life in non-corrosive service.

film of hydrogen is described as cathode depolarization.

In addition to these natural conditions and their effect upon corrosion rates, numerous other environments create potential differences on vessel surfaces, thereby increasing the total corrosion problem. Mill scale, covering most of the surface of hot-rolled plate steel, is relatively insoluble in brine and provides considerable protection from corrosive action. Consequently, bare metal adjacent to the scale is subject to first action, thereby becoming anodic.

Pitting occurs at breaks or around the edge of the scale at a rate dependent upon two variables viz., the ratio of anodic to cathodic area, and the amount of cathode depolarization existent. Rapid pitting action sometimes found along the welded seams of brine vessels may be explained by this same mechanism. Heat developed during welding produces a reactive surface near the bead which is anodic to adjacent areas. Failure of fire tubes in heater treaters by pitting near the weld is an example of this condition.

Deep abrasions, recessed areas, and surfaces in contact with extraneous foreign matter are subject to concentration-cell corrosion, potential differences being caused by varying concentrations of oxygen or metal ions in solution. Areas of lowest concentration in each case are anodic.

Corrosion Control. Regardless of the type of corrosion damage occurring within the brine-steel environment, hydrogen is deposited upon the cathodic area of steel. If the steel surface were completely covered with hydrogen, corrosion would not occur. Such a condition can be brought about by immersing magnesium connected by an external circuit, into the brine which makes the steel a cathodic surface, thus transferring the corrosive action to the magnesium.

Theoretically, magnesium will produce 1000 ampere hours of current per pound of metal expended. However, this cannot be attained because of localized corrosion on the surface of the anode. Industry experience has shown that anode efficiencies of 40 to 50 percent, i.e., 400 to 500 ampere hours per pound, may be expected from anodes buried in soil having resistivity of 2000 ohm-centimeters or less. Comparable performance has been reported from tests when the magnesium was buried in high-salinity soil, 100 ohm-cm, and in sea water, 20 ohm-cm, provided a current density of 200 milliamperes per square foot or more was maintained on the anode surface. Data are not presently available on magnesium performance in oil-field brines, which have resistivities ranging from 5 to 30 ohm-cm. However, it is reasonable to expect that an efficiency of 40 percent can be achieved in most cases.

The quantity of hydrogen deposited on the steel surface is a direct function of current density, amperes per unit area, applied to the cathode surface. The amount of hydrogen remaining, or maintained, on the unit area determines the degree of protection from corrosion. If insufficient hydrogen is maintained, the system will be ineffective; whereas if too much hydrogen is produced, the system will be inefficient. Only by developing an easily measured index of protection can minimum protection cost be attained.

A potential is produced by the contact of hydrogen and iron in an electrolyte such as brine. This potential opposes that of the corrosive action, its magnitude varying with the amount of hydrogen present and other characteristics of the electrolyte. The amount of hydrogen can be measured qualitatively by measuring its effect upon the total potential difference between the tank surface and a reference electrode placed in the brine. Any standard electrode and a potentiometer will measure the total potential with sufficient accuracy.

Pipe lines buried in earth are presumed to be protected from corrosion when the potential between pipe surface and a copper-copper sulfate electrode in adjacent earth is maintained at, or more than, 0.850 volts. S. P. Ewing[1] found that the potential necessary for complete protection of steel in soil could not be defined by any one potential. The investigation revealed that the necessary potential varied somewhat with the characteristics of soil and environment, protection being obtained in some cases when the potential was nearer 0.820 volts.

There is no basis for an assumption that any one potential or any one current density will define protection of steel in oil-field brines, because of the widely varying brine compositions encountered.

Test Procedure. In an effort to obtain data useful in planning effective cathodic protection procedures appli-

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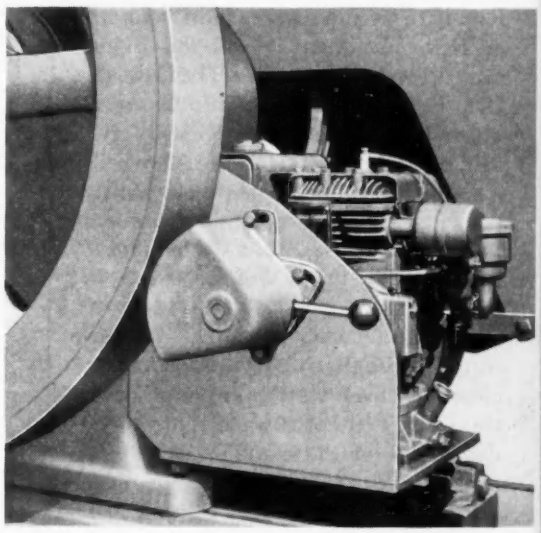

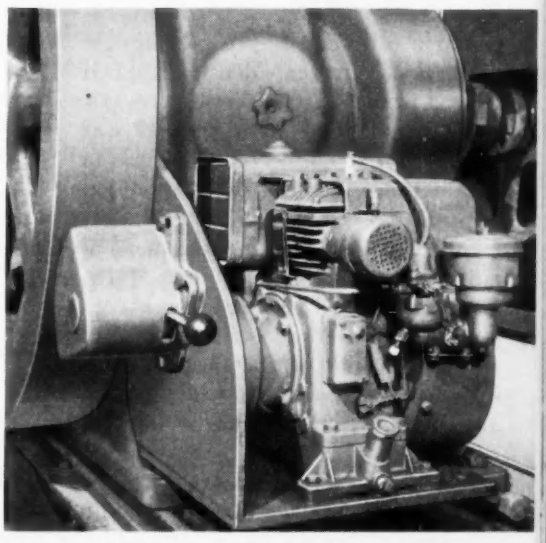

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cable to brine vessels, experiments were conducted in two wash tanks in Trapp Pool, Russell County, Kansas. Test 1 was made in a 210-barrel welded steel vessel which processes the sour effluent from two wells produced from the Arbuckle limestone, throughput averaging 11 barrels of oil and 340 barrels of brine per day. Test 2 was conducted in a galvanized, bolted, 210-barrel wash tank handling total effluent from two Kansas City lime wells, fluid volumes averaging 23 barrels of oil and 3 barrels of water per day. The Kansas City brine does not contain appreciable hydrogen sulfide. Respective brine characteristics are shown in Table 1. Because the Arbuckle brine presents a general corrosion problem in central Kansas, data from Test 1 in Arbuckle brine will be given in detail.

Six sandblasted steel coupons, inserted through collars welded in the cleanout cover plate, were exposed in the water zone of a wash tank for 23 days. Five of the coupons were connected as cathodes to the magnesium anode in the tank, with current flow to the coupons being controlled in such a manner that each coupon received a different degree of cathodic protection. Current density applied ranged from ½ to 6 milliamperes per square foot. The sixth coupon was purposely not connected in order to obtain the relative weight loss of an unprotected coupon. Circuit arrangement for control and measurement of current is shown in Figure 1(B). Current applied to individual coupons was held reasonably constant throughout the test, and was measured by determining the voltage drop across a fixed resistance in series with the coupon.

The open circuit potential of each coupon with respect to a Cu-$CuSO_4$ electrode placed in the brine was determined coincident to current measurements, using a potentiometer which had been calibrated against a standard cell. The circuit for this measurement is shown by Figure 1(A). An ordinary copper sulphate electrode can be used for the potential measurement, provided a few simple precautions in using the electrode are observed. Seal at the point of wire entry into the top of the electrode and any splices that may be exposed to brine must be waterproof. The solution chamber must be full before each test, otherwise brine will displace the air bubbles and contaminate the solution, which changes the potential of the electrode. When used in sour brines, the copper sulfate solution absorbs hydrogen sulfide; consequently, the electrode must be cleaned and filled with fresh solution occasionally, and checked frequently against a clean electrode held in reserve as a sub-standard. Conductivity of the porous wood plug in the bottom of the electrode was not adversely affected by repeated immersion in crude oil.

The true open-circuit potential of a metal surface can easily be obscured by improper measuring technique because of the rapid depolarizing effect that might result from an improper connection to an external circuit. For this reason, the coupons were disconnected momentarily from the anode circuit and connected to the potentiometer for an instant by using a snap-action, single-pole, double-throw switch, simultaneously bringing the potentiometer setting nearer to balance. When the galvanometer needle does not deflect as the coupon is intermittently switched from the anode circuit, the potentiometer reading is the true open-circuit potential of the coupon.

TABLE 1
Brine Characteristics

Producing Formation	Arbuckle	Kansas City
Specific Gravity	1.030	1.085
pH	6.3	6.7
Hydrogen Sulfide, parts per million	154.2	0
Total Dissolved Solids, parts per million	37,645.3	117,964.6
Primary Salinity, percent	89.74	76.86
Secondary Salinity, percent	9.16	23.09
Secondary Alkalinity, percent	1.10	0.05

About the Author

CECIL O. SMITH, corrosion engineer, The Carter Oil Company, was employed by that company in 1936 upon graduation from Kansas State College, where he received a B.S. degree in electrical engineering. Following 13 years service in Carter's geophysical division, he transferred to production engineering in 1949, being assigned to the headquarters office staff in 1950 with responsibility for coordinating corrosion engineering activities throughout the area in which Carter produces oil.

Test Data. Figure 2 presents a curve showing averaged coupon potentials over the range of current densities applied. The degree of coupon polarization does not vary uniformly as the current density increases. One interpretation of this behavior, useful from a standpoint of anode economy, is that at the lower current densities, the hydrogen maintained on the coupon did not form a complete film, and that each increment contributed singularly to changing the potential of the coupon. At higher current density, when the coupon potential approximated one volt, the supply of hydrogen was just sufficient to maintain a substantial film on the coupon. As the current density was further increased, the quality of the hydrogen film was improved only perceptibly, and disproportionately to the increase in current.

Coupon weight loss vs. accumulated milliampere hours is depicted graphically in Figure 3. Although the weight loss varied inversely with current density, there was some weight loss on the coupon having the highest current density. This was expected because slight corrosion will usually occur upon initial exposure of such highly reactive surfaces as sandblasted steel. In addition, some iron was lost in the form of iron sulfide, which gave the surface a dark grey to black color, not affected by brushing under water and detergent, or acetone. Hydrogen sulfide was liberated when the coupons were later washed with an inhibited hydrochloric acid, from which it was concluded that iron sulfide formed on the coupons regardless of cathodic protection. It was assumed that reasonably equal quantities of iron sulfide formed on each coupon. The test procedure purposely avoided the extremely high current densities that would be necessary to prevent or further minimize initial corrosive action.

It is concluded from the coupon potential curve, Figure 2, that a po-

tential of approximately one volt must be maintained between tank steel and a Cu-$CuSO_4$ electrode in the brine to prevent corrosion of steel by brines having similar composition, and the same pH of the Arbuckle brine tested. There is considerable risk in assuming that a certain current density will protect a tank surface because of the varying energy requirements involved in maintaining an equivalent hydrogen film on surfaces having different physical characteristics. In most cases there is usually some uncertainty of the exact areal extent of steel receiving current.

Data from Test 2 indicated that a potential approximating 0.900 volt will protect steel from corrosion in the Kansas City brine at the location of test. Although the brine has a lower resistivity, as is evidenced by the higher concentration of dissolved solids, a very low current density produced sufficient hydrogen to maintain the potential at 0.900 volt. The five protected coupons in Test 2 exhibited very slight and relatively equal weight loss, whereas the unprotected coupon lost appreciable weight by corrosion. Although the Kansas City brine as produced is not classed as a corrosive brine, this test was made purposely to determine protection requirements in contrasting types of brine.

In Test 2, the zinc plating on the tank interior was anodic to the coupons, thus eliminating the need for a magnesium anode. It was found necessary to use a dry-cell battery to provide a voltage opposing the flow of current from the zinc to coupons. Varying brine throughput affected the zinc to steel potential, which in turn increased the difficulty of maintaining a constant current flow to the coupon.

Coupon weight losses in both tests were less than was expected, necessitating careful handling and accurate weighing procedures.

Cost of Cathodic Protection. Application of cathodic protection using magnesium anodes must be preceded by realistic economic analyses considering all factors that contribute to total damage cost and comparing this to an estimated protection cost.

Experience gained at 15 magnesium anode installations in central Kansas indicates that protection cost will probably average less than $3 per tank-month for vessels in the 200- to 300-barrel capacity range. By scheduling anode applications with the program of annual tank cleanout, installation labor charges were held to a minimum. Magnesium cost only at these 15 applications amounted to 75 percent of the total costs of anode installation, which emphasizes the importance of obtaining maximum anode efficiency. The inter-dependent relationship between system performance and cost of protection can be demonstrated by planning a hypothetical installation of magnesium in a vessel processing the Arbuckle brine described in Table 1.

A 210-barrel, 10-foot diameter, ¼-inch steel wash tank, equipped with 10-inch downcomer, is to be placed in service. This vessel costs approximately $1500 set up in the field. From experience with similar vessels in the area, it may be assumed that the lower 6 feet of this tank will be exposed to brine essentially free of oil or emulsion. Presuming that the vessel interior will be accessible annually, choice of anode size will depend upon current requirement. It is concluded from the current-potential curve of Figure 2, that three milliamperes should be applied to each square foot of steel surface exposed to brine. Calculations indicate that 280 square feet of tank surface must be protected; therefore, the anode must supply a minimum current of 0.84 amperes. Assuming an average 40 percent anode efficiency, 18.4 pounds of magnesium will be consumed in one year. Common anode sizes being 17 and 32 pounds, the 32-pound size should be installed. Excess metal provides reserve capacity, in that the anode will supply a maximum average current of 1.46 amperes for one year.

A 32-pound anode, costing $16, and miscellaneous material including a packing gland welded into the cover plate, variable resistor, and solderless connectors, represent a total installation cost of approximately $22. Estimated protection cost for the wash tank will be $1.83 per tank-month. Substantial savings may be effected by cathodically protecting this tank with a magnesium anode, as will be seen upon reference to Figure 4. Assuming that the wash tank would have a normal service life of 30 years if not damaged by corrosion, and a life of only 10 years in corrosive service, the resulting damage cost will be $8 per tank-month.

An additional factor favoring the cost of protection is that current flowing through neutral or alkaline brines may cause a calcareous-like coating to form on the cathodic steel surface. This coating protects the steel in that it forms a mechanical barrier between the brine and the metal. The rate of deposition will be governed principally by current density applied and brine composition. Corrosion literature[2] describing cathode coatings reports that equivalent protection will be obtained, after the coating forms, with lower current densities.

Conclusions. Measurements of potential, current and weight loss on steel coupons exposed under actual field conditions are believed necessary for accurate determination of cathodic protection requirements. Small coupons, as were used in these tests, can be replaced without draining or opening the tank. Disadvantages of small coupons were found in the difficulty of maintaining and controlling the minute currents to a constant value. It is probable that better control over current to the coupon can be obtained by isolating the tank from the anode-coupon circuit. An external potential, opposing the flow of current to the coupons may be needed in some cases.

The test procedures used have some inherent faults. At the present time, a better method of measuring vessel protection is not readily apparent.

A resistor should be used in the anode lead at each installation of magnesium in brine for the purpose of controlling the current and adjusting its value until the desired potential is obtained.

This rather specialized application of cathodic protection merits consideration by anyone concerned with cost reduction. More efficient procedures and application of this principle to many other corrosive environments will result from experience and study of accumulated performance data.

ACKNOWLEDGMENT

The writer expresses his appreciation to The Carter Oil Company for permission to prepare this paper; and fully acknowledges the assistance and advice given by Dr. S. P. Ewing of Carter Research. This paper presented at the Mid-Continent meeting of API held at Tulsa, Okla., March 18-20, 1953.

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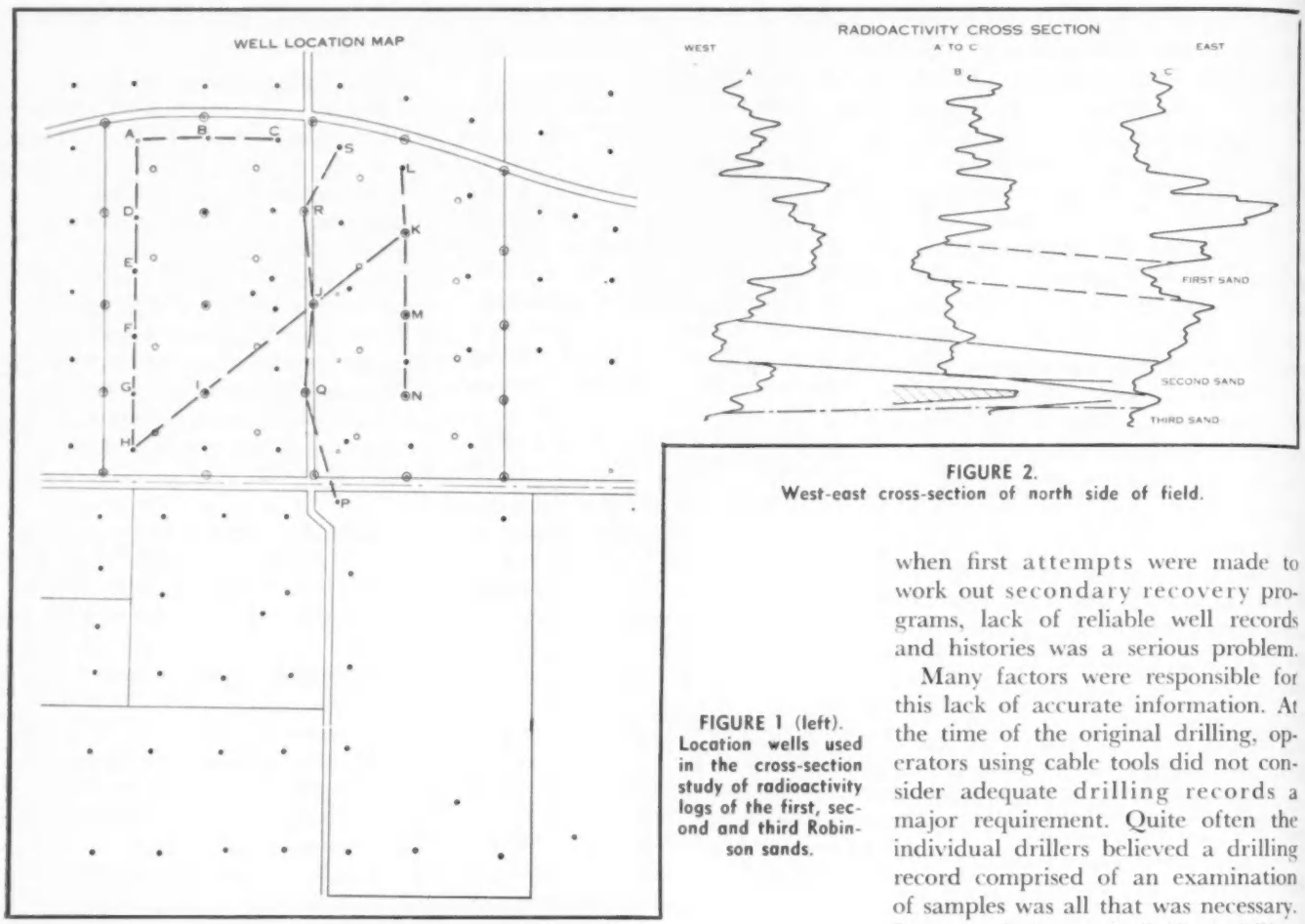

FIGURE 2.
West-east cross-section of north side of field.

FIGURE 1 (left).
Location wells used in the cross-section study of radioactivity logs of the first, second and third Robinson sands.

Guesswork Is Removed In Flood Evaluations

Radioactivity logging in old wells proves useful tool in evaluating water-flood prospects.

By N. J. MELLIES and C. W. CLARK
Lane-Wells Company

WITH THE DEVELOPMENT and demonstrated feasibility of secondary recovery operations, particularly waterflooding, radioactivity logging has proved an effective tool in furnishing a clear picture of subsurface conditions, especially in old areas where previous drilling records are unreliable.

The success with which this technique has been applied is demonstrated in a large producing area in Southeast Illinois stretching from the northeastern corner of Clark County, and south and east through Crawford and Lawrence counties into the northern portion of Wabash County. Success may be expected in other similar areas.

Producing formations in this area are quite complex. The Pennsylvanian sands are of a lensing type, individual members varying in thickness and in some cases appearing to be completely replaced, with other lenses appearing within the same formation and resulting in very confusing patterns.

Many wells drilled in this area between 20 and 30 years ago were drilled by small independent operators who kept incomplete and often inaccurate drilling records. Thus, when first attempts were made to work out secondary recovery programs, lack of reliable well records and histories was a serious problem.

Many factors were responsible for this lack of accurate information. At the time of the original drilling, operators using cable tools did not consider adequate drilling records a major requirement. Quite often the individual drillers believed a drilling record comprised of an examination of samples was all that was necessary. In many instances individual drillers had strong opinions regarding the interpretation of samples, which resulted in erroneous opinions. These still exist in many well records.

In order to work out satisfactory recovery programs, engineers naturally looked for modern tools to assist them in their search for adequate data. In areas where new wells were drilled, cores and core analysis readily solved the problems. However, it was felt much time and expense could be solved if some system were available whereby data could be obtained on the thousands of old wells regarding the location and thickness of the sand bodies, subsurface elevations, porosities and general formation characteristics.

Electrical resistivity logging was used and within its limitations proved helpful. With this method a conductive fluid had to be injected into the bore hole to permit electrical logging, but obstacles, such as junk, screens, etc., interfered with obtaining an electrical resistivity curve. These curves were further limited in their use to only the open hole portion of the old wells.

Radioactivity well logging tech-

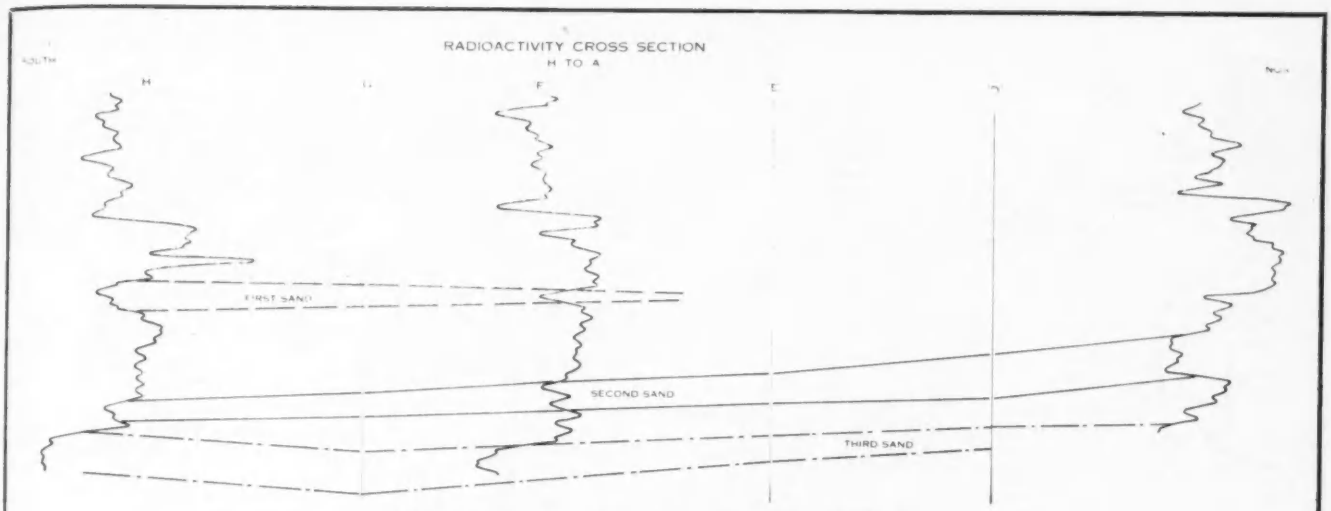

FIGURE 3. North-south correlation along west side of field.

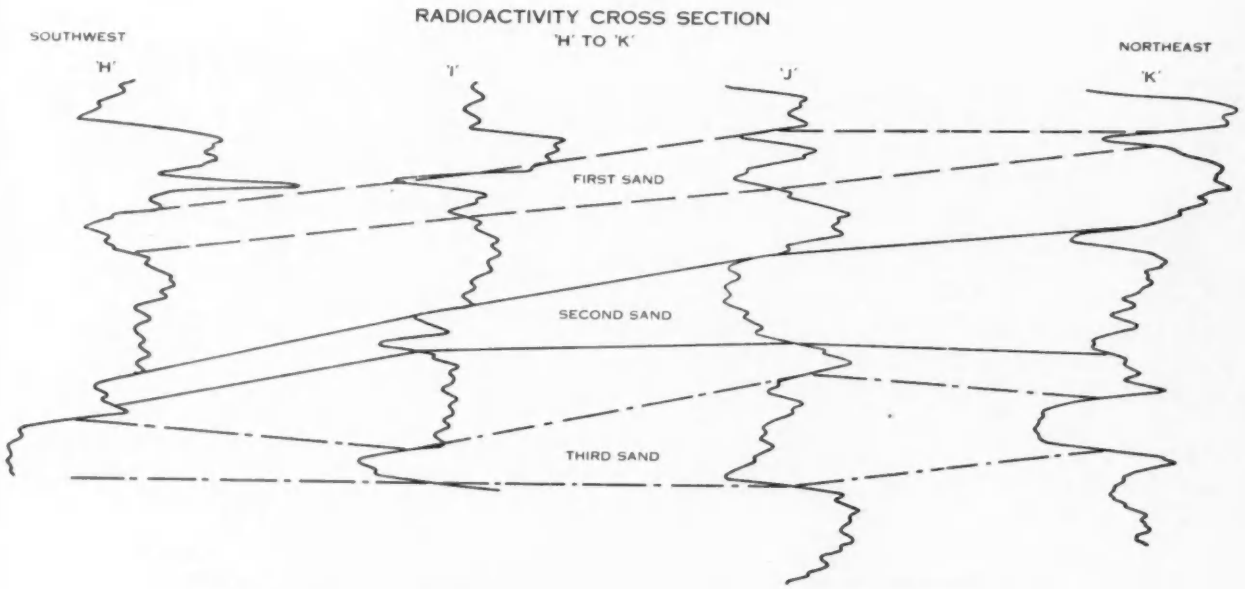

FIGURE 4. Northeast-southwest cross-section based on radioactivity logs.

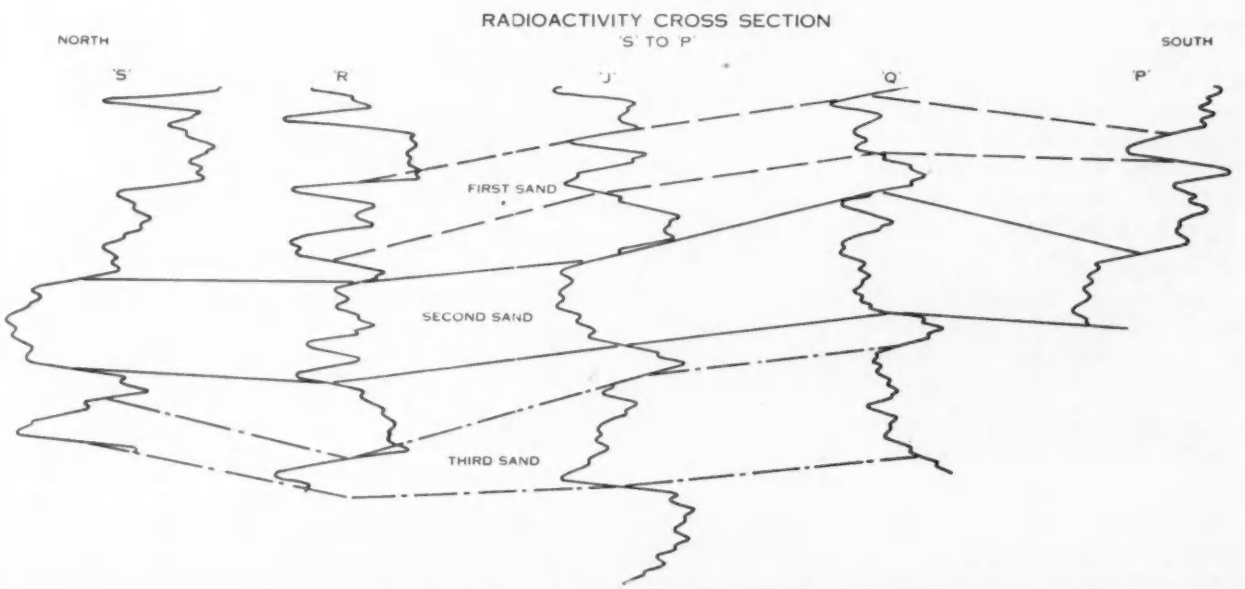

FIGURE 5. North-south cross-section through central portion of field.

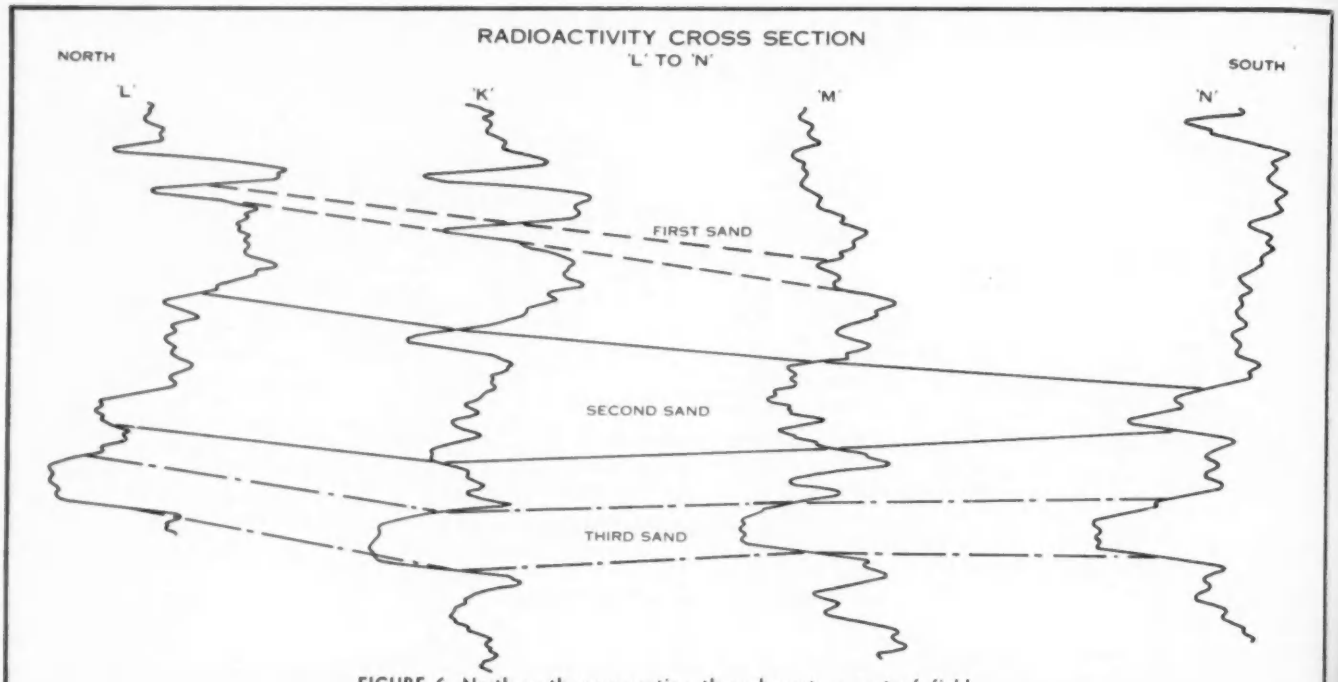

FIGURE 6. North-south cross-section through eastern part of field.

FIGURE 7.

FIGURE 8.

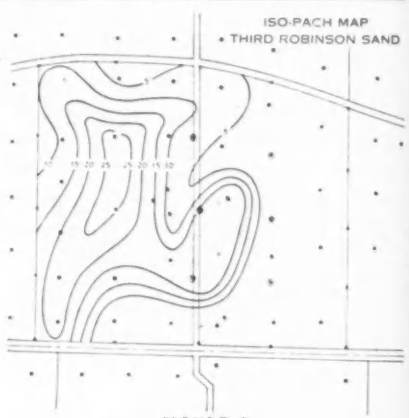

FIGURE 9.

niques were applied to the problem. First, to single problem wells, and then, as the feasibility of the method became apparent through use, it was applied to entire leases and pools. Cross-sections were made from them to correlate sand thickness and lensing of shales. They were also used to locate the best wells to be used for input purposes.

Specifically, radioactivity logging has helped to determine some of the following unknown conditions, information that is very essential to a successful water-flooding program:

1. The top of the producing sand and its subsurface elevation.
2. The bottom of the producing sand, if drilled deep enough.
3. The cleanness, or absence of sizeable shale lenses and partings.
4. The thickness of the producing sand and the indication of its net effective thickness.
5. The possible location of whatever strings of casing still remaining in the well.
6. The top and bottom of any enlarged bore hole resulting from nitro shots, etc.
7. An idea of conditions of the bore hole, such as covered sand faces, junk in hole, etc.

With this data, water-flood engineers have been able to prepare structure maps, various isopachs, plan a logical workover program for the present existing wells, as well as using the data in other ways. Equally important, the technique permits knowledge as to where to locate additional core holes so that maximum information both directly and indirectly can be obtained and tied into the overall reservoir picture.

Radioactivity logs of old wells in this Illinois area have enabled engineers to obtain accurate answers to sand continuity or discontinuity, the interfingering of sand and shale lenses, the location of dense or low porosity barriers within the sand lenses, accurately locating shale barriers, etc. In short, the application of radioactivity well logging in this drilled up area has enabled reservoir and water-flooding engineers to reduce a confused mass of seemingly unrelated data into a regulated and clear pattern for eliminating errors and estabing facts upon which to base an intelligent water-flooding program.

An excellent example of the use of radioactivity logs in an Illinois water-flood project is shown in the accompanying sketches.

Figure 1 shows the location of a

■ CONTINUED ON PAGE 232

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How to Select a Subsurface Pump Plunger to Fit The Job

Longer life and reduced maintenance costs will be the results.

By KENNETH N. MILLS, Chief Engineer
Walter O'Bannon Companies, Tulsa, Okla.

LIFTING COSTS can be kept at a minimum by selecting the type of subsurface pump plunger to fit the job, since the design and construction of the plunger influences both the initial cost of the pump and its service life. Pumps are available with a wide range of plunger designs which have been developed to meet a wide range of service requirements imposed on the pump by various fluids and conditions found in oil wells.

The most economical type plunger is one which will yield a favorable balance between the initial cost of the pump and the cost of maintaining the pump. Pump maintenance cost must include the cost of pump repairs, cost of well service, if performed exclusively to repair the pump, and the value of the lost production if it cannot be recovered.

General considerations influencing pump life are height of fluid lift, corrosive and abrasive characteristics of well fluid, bottom-hole temperature, water content of fluid and fluid viscosity at the bottom-hole temperature. Height of the fluid lift is an important consideration because it determines the pump working pressure and, therefore, magnitude of the fluid load imposed on the plunger sealing elements. Corrosive characteristics of the well fluid will influence the life characteristics of the plunger because it can cause deterioration of both plunger and barrel. Abrasive characteristics of the fluid will have a definite influence on plunger selection because mechanical characteristics of the sealing elements will influence its resistance to abrasion. The bottom-hole temperature may influence plunger choice because high temperatures will produce undesirable changes in the mechanical characteristics of rubber sealing elements. Water content of the fluid will partially control its value as a lubricant and therefore will influence plunger choice. Viscosity of the fluid is an important consideration because it determines the rate of fluid slippage through small openings.

Basic Types. Sucker rod pumps are available with two basic types of plunger sealing elements: metal-to-metal seals and soft packed seals. The fluid seal in a metal-to-metal pump is created by the fluid friction developed in the space between the plunger and the barrel. In general the rate of leakage through this type seal is controlled by adjusting the length of the plunger to match the fluid pressure at the pump. In practice this selection is based on well depth.

If the well is not subject to excessive paraffin accumulation, the plunger length can be selected on the basis of 12 inches per 1000 feet of well depth. Minimum length of the plunger should be 24 inches. When the depth exceeds 6000 feet, the plunger length should be based on 10 inches per 1000 feet of well depth. If the well is subject to excessive paraffin accumulation, plunger length should be increased by a minimum of 12 inches to carry the additional pump pressure created by the paraffin accumulation in the tubing. A controlled amount of plunger leakage is essential to the operation of this type pump, because this fluid provides lubrication for the sliding surfaces. The amount of this loss is very small, when the pump is selected to fit the well conditions. These pumps are available with a wide range of barrel and plunger material combinations which have been developed to cope with all types of well conditions.

Fluid Slippage. Principal factors controlling the rate of fluid slippage by the plunger in a metal-to-metal seal pump are plunger length, plunger clearance and fluid viscosity. Minimum plunger clearance is established by lubrication considerations and cannot be considered as a variable in the usual installation. Usable life of the pump will be determined by the magnitude of plunger wear which will increase this clearance and decrease the efficiency of the pump. Rate of this clearance increase can be controlled by selecting material combinations which have good wear characteristics when lubricated with the well fluid.

Maximum allowable increase in plunger clearance consistent with reasonable pump efficiency is partially controlled by fluid viscosity. The absolute viscosity of oil well fluids commonly produced range from approximately 1 centipoise to 100 centipoises, and it usually decreases as the water content increases. Viscosity of low-gravity crude oil is highly in excess of 100 centipoises and metal-to-metal pumps used to produce this type oil may require higher initial clearances to assure adequate plunger lubrication and free action of the plunger in the pump barrel.

Rate of slippage by the plunger in a metal-to-metal pump is expressed by the equation:

$$S = \frac{1.382\ \pi d\ D\ C^3}{UL\ 10^{-8}}$$

where:

S = Slippage rate, Bbls. per 24 hours.
d = Plunger Diameter, Inches.
D = Depth to Pump, 1000 feet.
C = Diametral Plunger Clearance, Inches.
U = Absolute Viscosity of Fluid, Centipoises.
L = Length of Plunger, Inches.

This equation can be used to show the importance of choosing proper plunger length. This choice involves two considerations. First is the leakage rate when the plunger is new. This phase of the problem is illustrated in Figure 1. This graph shows the variation in leakage rate with depth for several lengths of plungers in a 1¼-inch bore pump, with .003-inch clearance when pumping a fluid with a viscosity of 3 centipoises. From this graph it is apparent that the plunger length must increase with depth if a constant efficiency is de-

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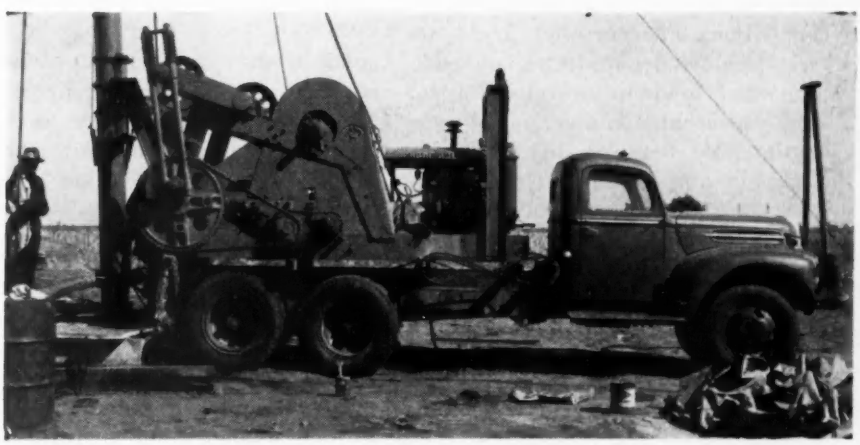

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sired. However, the maximum slippage rate with a short plunger operating in a deep well is not excessive.

Wear will increase the clearance between the plunger and barrel and consequently will increase the slippage rate. Slippage rate will increase in proportion to the cube of the clearance, and therefore, wear is an important consideration. The effect of clearance increase on the slippage rate for a 1¼-inch bore pump with a 60-inch long plunger is shown in Figure 2. As slippage rate increases rapidly with increasing clearance, length of the plunger must be increased with depth to assure a long, high efficiency pump life span.

Rate of increase in clearance is dependent on wear and corrosion resistance of the plunger and barrel materials. As the location of these materials will not materially affect either their wear or corrosion resistance, the basic type of pump construction can be neglected. Therefore, these considerations can be applied with equal accuracy to liner barrel pumps with one-piece metal plungers and full barrel pumps with composite plungers. Some of the common materials used for sealing surfaces are listed in Table 1. These materials are listed in the order of their relative wear resistance starting with the material with greatest wear resistance.

Corrosion Effects. Effects of corrosion on pump efficiency are dependent on the degree of activity of the corrosive agent. Under conditions of mild corrosion, it can be responsible for limited wear. This wear is the combined results of mechanical and chemical action. The corrosive agent attacks the metal and forms an oxide film which tends to protect the metal from further attack. Mechanical wear continuously removes this protective oxide film and presents a clean metallic surface for corrosive action. This process tends to speed up the rate of mechanical wear because it is the combined result of mechanical wear and corrosion. It can be reduced to a minimum by choosing materials which

TABLE 1

COMPOSITE PLUNGER Material	BARREL Material
Ni-Hard	Chromium Plate
Alloy Iron Hardened	Hardened Steel
Alloy Iron on Hardened	Cold Drawn Steel

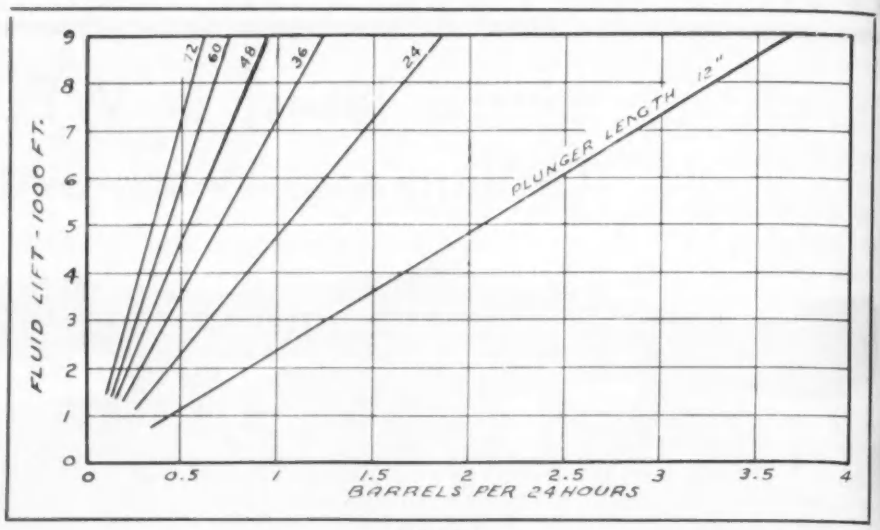


FIGURE 1.
Variation in leakage rate with depth for several lengths of metal-to-metal plungers in a 1¼-inch bore pump with .003-inch clearance when pumping fluid of a 3 centipoise viscosity.

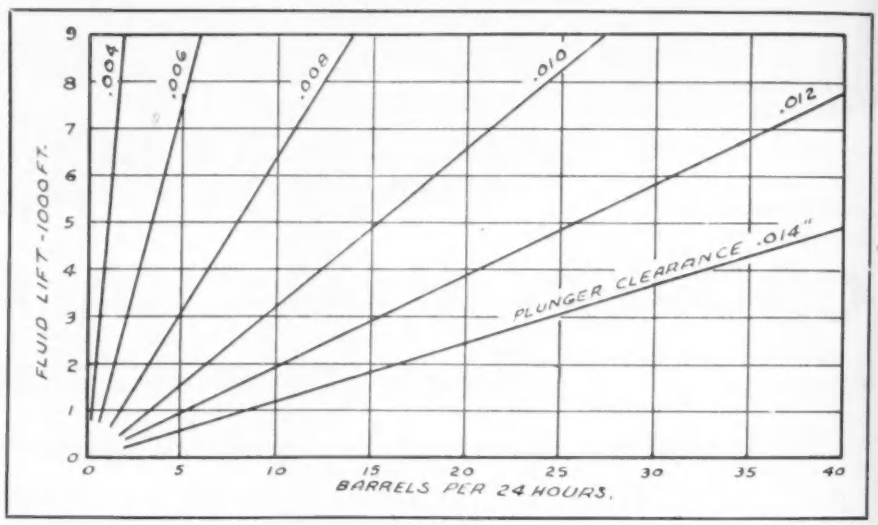


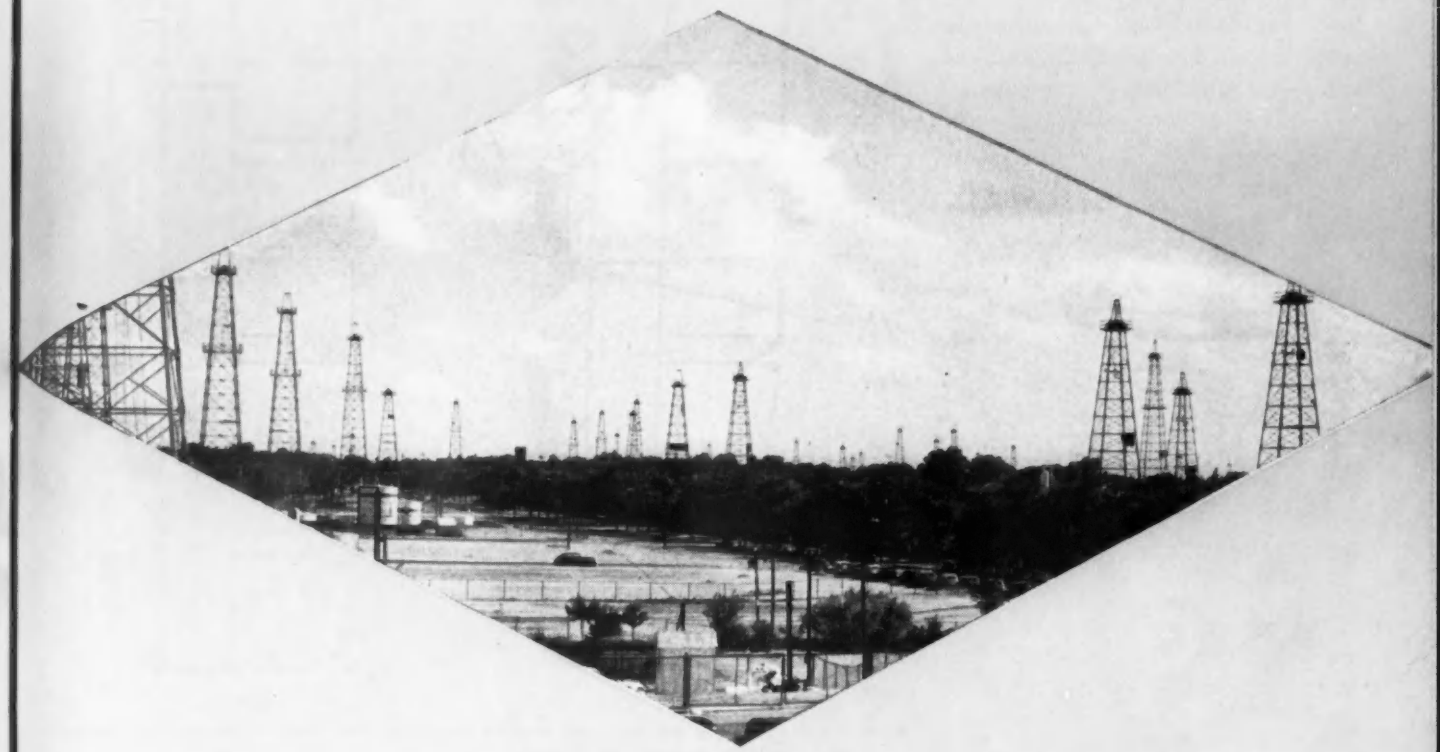
FIGURE 2.
Effect of clearance increase on the slippage rate for a 1¼-inch bore pump with a 60-inch plunger.

have excellent abrasion and corrosion resistance.

When the fluid is highly corrosive it is necessary to choose plunger and barrel materials which have good corrosion resistance. The cast material should be a hard corrosion resistant material. The other member should be made of a corrosion resistant material with good wear resistance.

Soft-Packed Plunger. The soft-packed type plunger is available in a wide range of designs which have been developed to pump most types of well fluids from moderate depths with high efficiency. As they develop their sealing action with soft materials in sliding contact with the barrel, they are subject to wear. The wear rate in their sealing elements is usually greater than that experienced in the metal-to-metal pump and therefore their service life is usually less. Economic effect of this probable lower life expectancy must be considered when selecting the pump. Soft-packed pump plungers are available in a wide range of designs using valve cups, fabric and rubber rings, repacks and combinations of these devices as sealing elements.

Cup Types. The most common type of soft packed plunger is the cup type plunger using API valve cups. A typical cup-type plunger assembly using two four-cup stands is shown in Figure 3. When a plunger is fitted with API type valve cups, the number of valve cups on a single body must be limited to assure a positive



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seal between the cup and plunger body. If the number of cups is not limited, the inner flange of the cup will yield and wear at the point "A" in Figure 4. If wear occurs at this point the fluid will leak around the valve cup and render the cup ineffective as a sealing device. Wear and yielding of the valve cup at this point is the result of carrying the total load on the flange of the valve cup. The lip type valve cup has been developed to eliminate this point of weakness in the cup type plunger. Construction of the lip type cup plunger assembly is shown in Figure 5. In this illustration it will be noted that the inner flange of the valve cup is clamped to form a fluid seal and it is relieved of the load created by the fluid acting on the valve cups by the collar "A" on the cup ring. The lip type cup has the advantage of permitting the use of large numbers of cups on a single body.

FIGURE 3.
Typical cup-type plunger assembly using two four-cup stands.

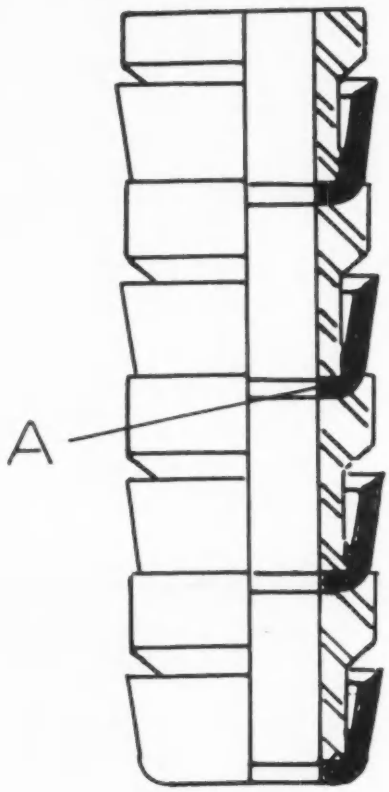

FIGURE 4.
Inner flange of the cup will yield and wear at Point A if number of cups is not limited.

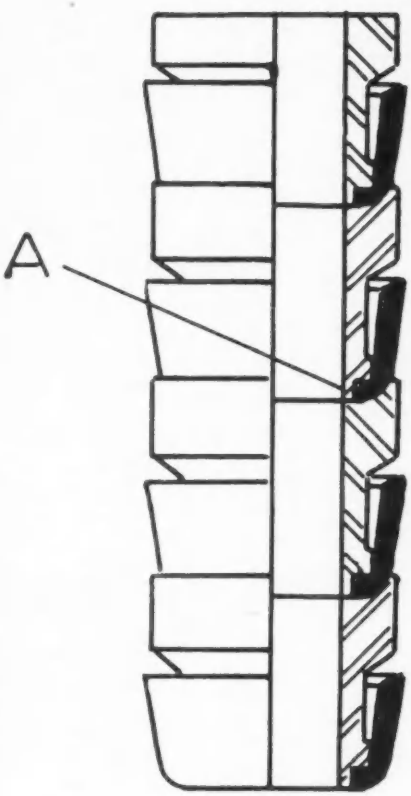

FIGURE 5.
Lip-type cup plunger to increase wear resistance of cups.

Number of Cups. Service life of a cup sealed plunger is a function of the number of cups for two reasons. First, during the initial wear-in phase of cup life some leakage occurs between each cup and the barrel. Velocity of this fluid is dependent on the number of cups and decreases as the number of cups is increased. As the ability of the fluid to cut the cups is dependent on its velocity and deceases as the velocity is decreased, increasing the number of cups decreases the probability of the cups being fluid cut before they wear-in with the barrel. If the cups wear in without being fluid cut they will form an efficient seal.

When the valve cups have conformed with the barrel and formed a positive seal, the entire fluid load is carried on a single valve cup. As the plunger executes its motion, fluid is accumulated in the space between adjacent valve cups. When this fluid accumulation reaches a critical value, one cup is relieved of the fluid load and this load is transferred to another cup. This process of load transfer is such that all of the cups are called on individually to carry the fluid load, and the wear is distributed uniformly over all of the cups on the plunger. For this reason increasing the number of cups on the plunger will increase the service life of the plunger.

Cup type plungers will render good service in moderate depth wells producing clean fluids. As its sealing surfaces are sensitive to small nicks it is not well suited to the production of sandy fluids. To assure good cup performance, the cup material, hardness and its fit in the barrel must be carefully chosen. Hardness or density of the cup must be increased as the well depth increases. As a general rule, soft cups should be used in wells under 750 feet deep, medium cups should be used at depths between 750 and 2500 feet, and hard cups should be used at greater depths. Fit of the cups in the barrel must be based on well depth and the number of cups used on the plunger. The relationship between these factors and well depth is shown in Table 2.

Choice of cup material is the result of a recent development and it affords increased valve cup life in all types of pumping wells. The new type valve cup has its wearing surface made of nylon instead of cotton duck. As the wear resistance and strength of nylon

TABLE 2

No. of Cups on Plunger	Depth to Pump, Feet	Cup Size
10 or Less	2000 to 5000	Nominal
10 or Less	Under 2000	+15
Over 10	Under 5000	−15
Over 10	Over 5000	−30

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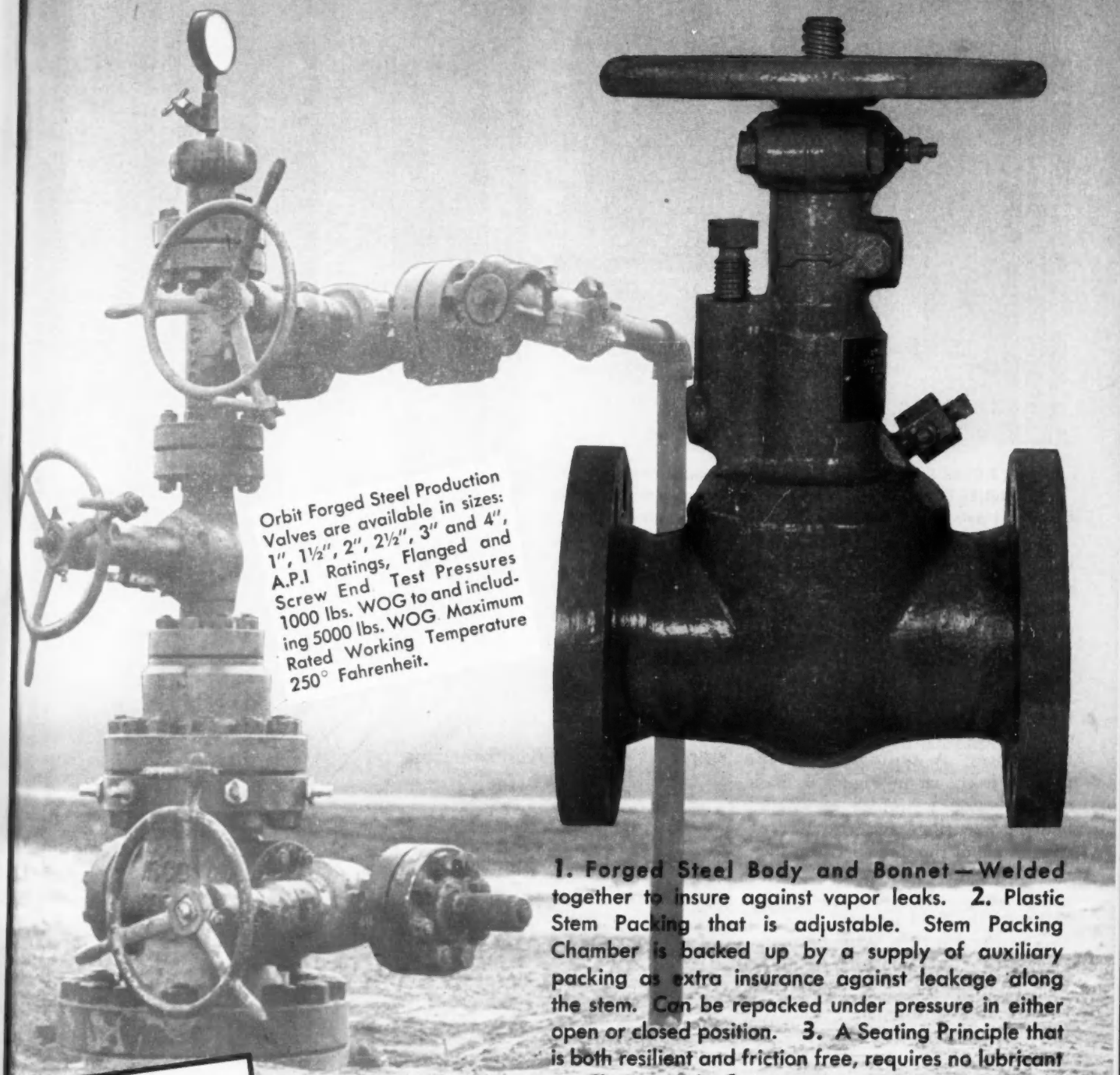

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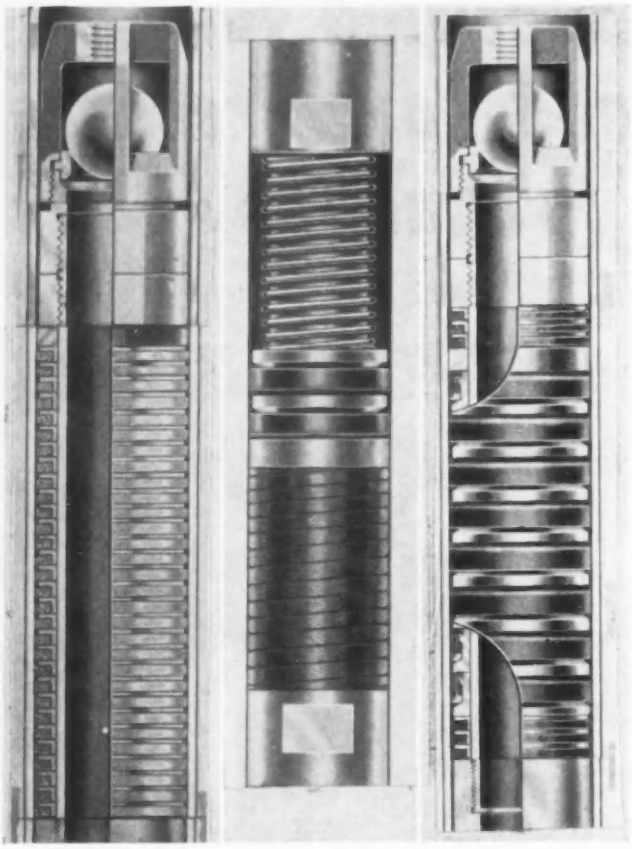


FIGURE 6 (left). Typical ring-type pump plunger.
FIGURE 7 (center). Typical repack-type pump plunger.
FIGURE 8 (right). Typical combination of ring and valve cups on pump plunger.

is greater than that of cotton, this material change increases the ability of the valve cup to resist wear and the adverse effects of fluid shock loads.

Ring-Type Plunger. The ring-type plunger is fitted with a large number of fabric and rubber rings in individual grooves. A typical ring-type plunger is shown in Figure 6. Basic sealing action is formed by contact between the rings and the barrel. Magnitude of the force between these two surfaces is dependent on the initial fit and swelling and is not influenced by the fluid pressure, as is the case with valve cups. As these plungers are similar in shape to metal plungers, they develop some sealing action by fluid friction between the cylindrical surfaces of the rings and barrel.

As the rings contain natural rubber they will swell in oil. Consequently, the fit of the ring in the barrel must be carefully chosen to secure the correct operating fit in the barrel. If this fit is not correctly chosen the rings will be either too tight or too loose in the barrel. If the fit is too loose, pump efficiency will be low. If the fit is too tight, sucker rods will be subjected to adverse loads. Peak well loads will be increased and the minimum loads will be reduced. This will reduce the life of sucker rods because it increases both the peak load and the range of load. Also, it will cause excessive barrel wear. As the swelling of the rings is difficult to predict and control, this type plunger is best suited to the production of wells producing high percentages of water from moderate depth. Properly fitted ring-type plungers can be used to produce sandy fluids. However, they may become loaded with sand and cause excessive barrel wear.

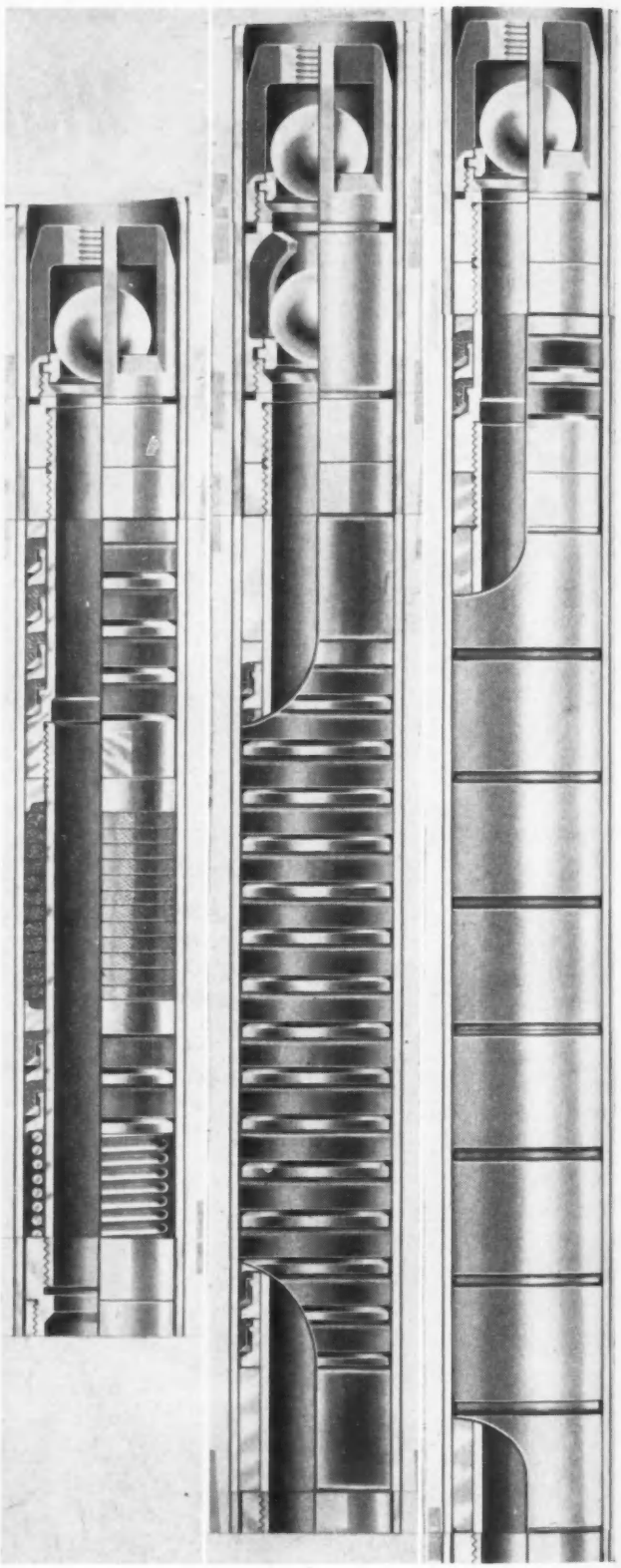
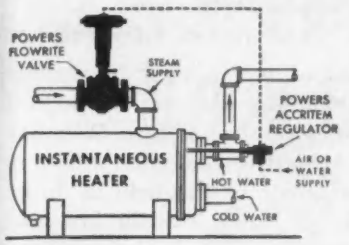


FIGURE 9 (left). Plunger using a combination of valve cups and a repack.

FIGURE 10 (center). Typical lip-type cup plunger with guide rings.

FIGURE 11 (right). Cup extensions fitted on metal-to-metal plunger.



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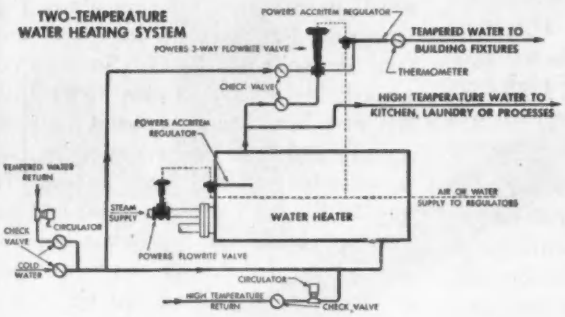

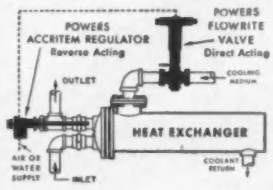

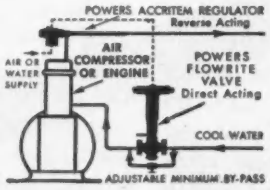

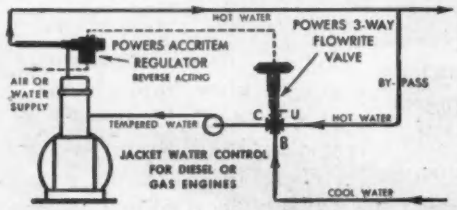

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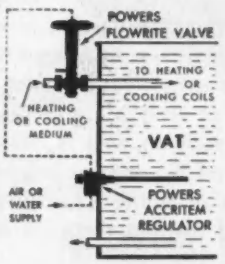

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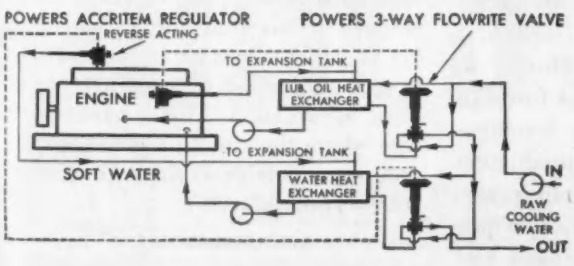

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Repack Plungers. The repack plunger consists of a coil of flax packing and two valve cups slideably mounted on the plunger tube. A typical repack plunger is shown in Figure 7. This type plunger is always installed with the valve cups exposed to tubing pressure. As the valve cups are slideable mounted on the plunger tube, the force exerted on them by the fluid in the tubing is transferred to the packing. This force causes the packing to expand and form a positive fluid seal between the plunger and the barrel. As this action only occurs on the lift phase of the stroke cycle, it does not interfere with the free fall of the plunger on the down stroke. However, the expansive action of the packing on the lift phase of the stroke cycle increases the sucker rod load. Consequently, this type plunger is not well suited to the production of deep wells. It is suited to the production of moderate depth sandy wells because the repack reduces the susceptibility of the valve cups to sand cutting. The repack type plunger is not well suited to the production of fluids containing high percentages of water because water tends to remove the lubricant from the packing.

Combination Types. Fundamentally, each type of soft packing is best suited to the production of a specific type well fluid. When they are used to produce fluid combinations for which a single type element is not ideally suited, their service life can be improved by using the proper combination of two types of sealing elements. A plunger using a combination of rings and valve cups is well suited to the production of sandy fluids providing the ring location is chosen to protect the cups. A typical combination plunger of this type is shown in Fig. 8. Note that the rings are located above and below the valve cups. When the rings are located in this manner they act as wipers and reduce the probability of the valve cups being sand cut. During the first few hours of operation when the cups are wearing in, the rings shield the cups from the full fluid load and thereby protect them from fluid cutting. When the cups are allowed to wear in in this manner, they will operate with minimum slippage and automatically take up wear until they are worn out. The rings also shield the cups from impact loads and act as guides to maintain the cups in proper alignment with the barrel.

A plunger using a combination of valve cups and a repack is shown in Fig. 9. Advantages of this combination are similar to those of the rings and valve cup combination, as the repack shields the cups from initial fluid cutting and impact. This type plunger is not well suited to the production of fluids containing high percentages of water because water will remove the lubricant from the repack.

Increasing Service Life. Service life of any soft-packed plunger can be improved by providing it with metal guide rings above and below the sealing elements. A typical lip-type cup plunger with guide rings is shown in Fig. 10. As these rings are closely fitted in the barrel, they stabilize the plunger and shield it from lateral loads. This action improves valve cup life because lateral loads will cause excessive cup wear. Also, these loads may produce cup distortion which will cause leakage and cup fluid cutting. As the guide rings are a close fit in the barrel, they reduce the magnitude of the fluid shock load imposed on the valve cups at the start of the up stroke. This reduces the maximum load on the valve cups and improves their service life.

Cost of a metal-to-metal seal pump can be reduced by fitting the plunger with a cup extension as shown in Fig. 11. Valve cups in this position will decrease the rate of fluid slippage past the plunger. Length of the plunger required for a given level of pump efficiency can be reduced. As the cost of a metal-to-metal seal pump is a function of plunger length, this reduces the cost of the pump. The metal plunger shields the cups from fluid shocks, lateral load from sucker rod buckling and sand. Also it affords the cups an opportunity to wear-in with the barrel and form an efficient seal. This plunger combination is applicable to the production of all types of well fluids. It is economically suited to applications which require metal-to-metal pumps but which do not yield sufficient revenue to justify their use.

Flood Evaluations

• CONTINUED FROM PAGE 220

number of wells used in a cross-section study of radioactivity logs of the first, second and third Robinson sands. A West to East cross-section of the north side of the field is shown in Figure 2. Notice how the first sand disappears in Well A in the northwest part of the field. Figure 3 shows the south to north correlation along the west side. Radioactivity logs were not run on wells D, E, G. So existing records were used. Notice again that the first sand stops between wells E and F, and that the second sand has practically "shaled" out in wells H and F. Figure 4 shows a cross-section running from the northeast to the southwest. In this cross-section one can easily see the shale barrier in the middle of the first sand which occurs in the wells I and J. The second sand varies from a thin section in well H which is quite shaley in the center portion. Well J has the cleanest and best section of the second Robinson sand. The third sand in this cross-section varies considerably in thickness, and has relatively clean sections in all but well J.

Figure 5 shows a cross-section from north to south through the central part of the sand. Here again, a considerable variation in the thickness and shale contaminations of the sands is demonstrated. The first sand is practically non-existant in well S. A distinct shale barrier is clearly evident in wells R and J. The north and south cross-section of the eastern portion of the field is shown in Figure 6, where we have the first sand becoming quite shaley in well M, and disappearing completely in well N. The second sand in well K contains a considerable amount of shale. The third sand is clear and distinct throughout this cross-section. Figures 7, 8 and 9 show the isopach maps of the three sands in this field.

A superficial study of these cross-sections shows that the radioactivity log plays an extremely important part in the untangling of seemingly unrelated information. This is particularly true where the structure is so complex and unpredictable as shown in the accompanying figures.

ACKNOWLEDGMENT

Acknowledgment and appreciation is made to the Davison Company of Robinson, Ill., K. Davison, C. E. Carr and the King Engineering Company of Mt. Carmel, Ill.; for releasing material contained in this article.

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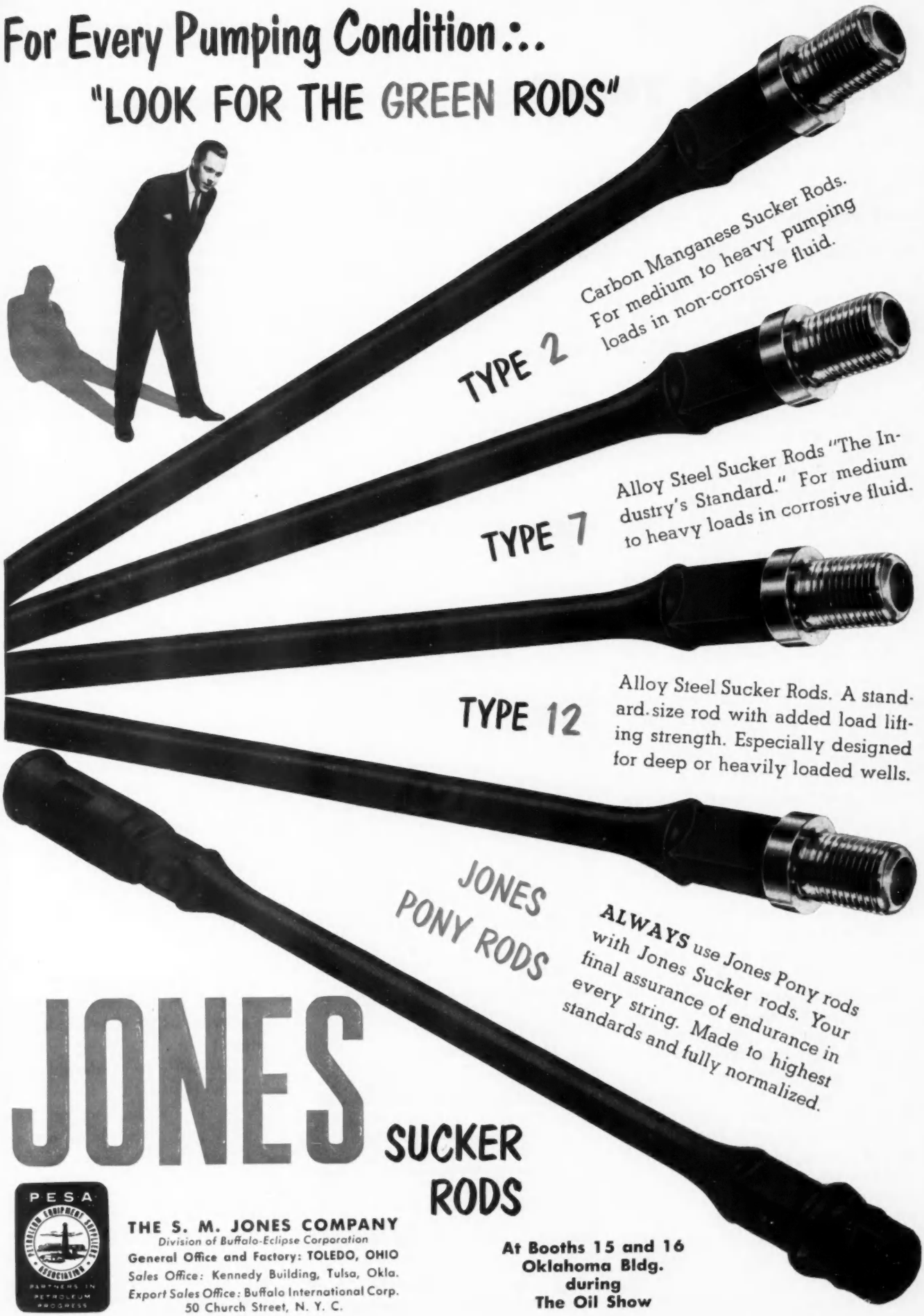

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Stop That Thief!

Thief zones within productive interval of a well can absorb untold volumes of oil. Here's how to locate them and what to do about them.

By F. R. COZZENS
Equity Oil & Gas Company, Stockport, Ohio

THIEF ZONES of shales, clay and silt, located within the vertical boundaries of a producing reservoir, are taking untold quantities of oil which are lost forever. These non-productive deposits become porous under certain environments and are highly receptive to fluid pressures from oil-producing horizons. Such reaction, coupled with haphazard operating practices, often convert supposedly barren beds into thief zones, capable of absorbing considerable quantities of produced oil. The opportune time for corrective measures is upon completion of the well, and such steps include (1) spotting of barren formations as the reservoir is drilled, (2) discrimination in the use of water and drilling fluids, and (3) strict confinement of fracturing or shooting procedures to oil-productive horizons.

Creation of Thief Zones. It seems logical to believe that an oil-bearing reservoir can rob itself of production. However, this condition is being revealed within the pay-formation bores of hundreds of wells. Almost invariably, the robbery is conducted through shales, clay, silt and similar reservoir media which is commonly included within its vertical boundaries. Considering a cross-section of reservoir from top to base (Figure 1), there are usually several layers of such media, each ranging from a few inches to three or more feet in thickness. They are generally sandwiched between oil-producing zones, or located immediately above or below productive zones. Having no definite permeabilities, these barren layers can, nevertheless, be rendered porous by exposure in open hole and by the action of water or drilling fluids.

Being deprived of energy which accelerates fluid movement through other areas of the reservoir, many of these layers are made highly receptive to fluids by pressures expended against them from the productive zones. Fluid receptiveness is increased further by disruptions, brought about in shooting, perforating, or by other bore-fracturing processes utilized in well completions. Unless precautionary measures are taken promptly, oil absorption into the newly-created thief zones begins as soon as the bore is filled, and continues, to some extent, during the entire span of economic production. In this subtle manner, supposedly barren media of a thickness of less than 12 inches can absorb hundreds of barrels of oil. And generally, the loot is deposited and lost in inaccessible areas of the reservoir.

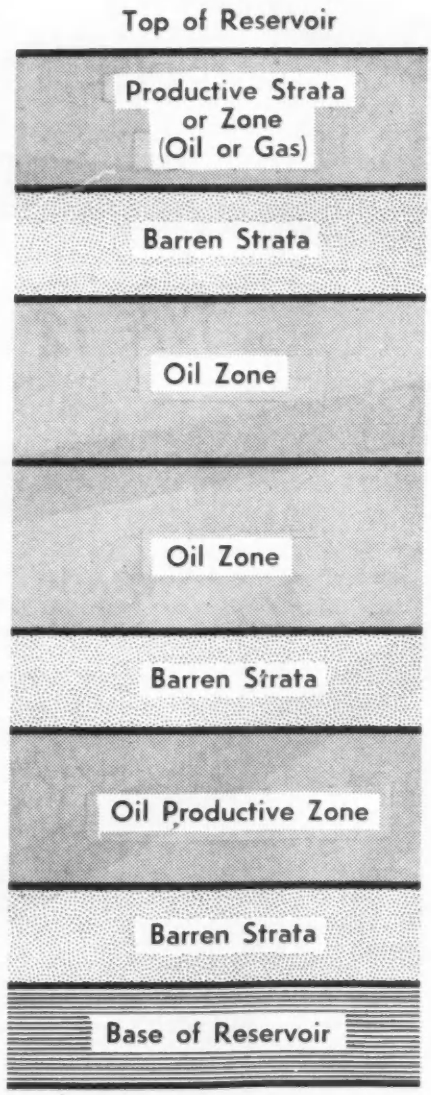

FIGURE 1.
Vertical cross-section of hypothetical reservoir to illustrate interbedding of barren strata.

Generous evidence of oil absorption within a reservoir is being revealed daily with the redrilling of partially depleted areas, preparatory to repressuring. In the majority of such new drillings, it is the rule rather than the exception to find oil pockets in shales and silt deposits while penetrating the so-called "pay" formation.

Oil saturated silt and clay often is bailed from new bores located within a radius of 75 to 150 feet from former producers, and the saturation invariably increases as the radius is contracted around the spent wells. It is not uncommon to find dense oil-saturations between normal pay horizons which have been depleted almost to exhaustion, and absorbed oil is encountered especially around former bore-pockets which have extended into shales below the reservoir.

The drill records of many old wells, around which, oil absorption is observed, reveal "streaks" or "breaks" in the pay formation, but rarely specify their position or thickness. Undoubtedly, these layers were the barren media which is now found impregnated with oil. Being heavily shot, along with the producing zones, as was the custom, it is obvious that much of such strata became receptive to oil and a continuous and expanding penetration resulted from both gravity and fluid pressures.

Distribution of Thief Strata. No two reservoirs are alike in structural composition and only rarely does a reservoir retain its physical profile for any great distance. There are fre-

quent fusions, cutouts, directional dips, lensing of layers, etc. And in practically all reservoirs, such irregularities in structure are replaced with some type of barren media or sedimentary materials, generally arranged in layers running parallel to the bedding planes. Clayey matrices usually predominate. Although some types are difficult to classify, being mainly a hodge-podge of reservoir components. Practically all such media can be made receptive to oil, and a receptive environment is not confined to scattered wells, nor is it limited to past drillings. Where no precautionary measures have been taken to isolate barren strata, oil is being wasted constantly through wells in primary production.

And it is likewise being pressured unintentionally into receptive media through wells now being subjected to secondary recovery methods. Substantiated evidence includes: (1) slow build-up of pressures when wells are closed in, (2) irregular rise and fall of fluids levels within the bore, and (3) frequent appearance of muddy oil, or mushy sediment in drip barrels and flow-lines.

When the drill records of such wells disclose breaks, streaks or layers of barren media along the reservoir bore, the operator can be reasonably certain that some percentage of the oil potential is being wasted. Oil wasted under such circumstances becomes displaced oil, and can not be recovered by any method yet devised. Ironically enough, these oil traps can, and often do, occur between highly productive zones. They may expand gradually over a course of years.

Control Measures. Practically every well which penetrates a reservoir exposes both productive and non-productive strata at various points along the course, but there is little or no evidence to prove that oil is absorbed in any appreciable quantities unless the non-productive media is disrupted, physically. Due to this fact, oil absorption into thief zones can be controlled at a surprisingly low cost by keeping all barren interceptive media in as near a virgin condition as possible. To attain this objective, the initial effort must be directed towards the spotting and recording of barren media in each new well while its reservoir is being opened. It is desirable to core the reservoir from top to base, or to a predetermined depth, or to log the formation, foot by foot, as the reservoir is being drilled. Barren media at various points along the bore can be thus detected, and while there is seldom time or opportunity for laboratory analysis during the drilling-in process, the non-productive cores or samples can be readily recognized, after surface oil is wiped off, by appearance and texture.

When cores are broken apart and examined under a magnifying lens, clay-filled spaces or crevices are commonly observed. The interior is found devoid of oil, and there are noticeable fusions and interlacings of structure. Position of any barren layer exceeding 12 inches in thickness, which is encountered along the bore, is verified by steel-line measurements or by approved logging instruments. Upon the accuracy of these measurements largely depends the future status of the zones involved.

When each barren layer, comprising a bore-stretch of 12 inches or more has been duly registered, according to its nature and position, special arrangements are made to protect it as much as possible during formation fracturing, or other well completion practices. If nitroglycerine, either liquid or solidified, is the fracturing agent chosen, spacers are placed between charges, each spacer being a few inches longer than the vertical stretch of bore it is designed to protect. In perforating, shots are confined strictly to oil-productive zones. When fracturing by other processes, or in acidizing, the barren stretches of reservoir bore are usually bridged and packed off with drillable materials. It is generally more practical to leave a few inches of productive bore unfractured than to have a part of its output stolen during the production cycle.

In wells where no fracturing processes are employed, stretches of barren media along a reservoir bore are often given protection immediately after being drilled by spraying the wall-surface with cement slurry or plastic compounds. In some areas, barren stretches of bore are cased off with acid-soluble pipe, or alloy tubes, which can be fished out later or destroyed with chemicals.

Oil productive zones normally carry some percentage of water which is produced along with the oil. Water, thus produced, is considered a part of the production, unless the fluid is found to be encroaching through otherwise barren zones. Such areas require plugging whenever possible, although oil absorption into these areas rarely occurs until after the water volume is exhausted. Pockets, or other bore extensions through shales below a reservoir should be sprayed or cased.

Many stretches of barren media are made receptive to oil during the primary clean-out. Since the exposed surface of most shales, etc., are inclined to scale or slough off, cleaning out processes should be made as brief as possible with just enough cleaning fluids being used to keep the residue in good bailing condition. Preferred cleaning fluids are chlorinated water, brines or water rendered slightly acid. In order to identify barren stretches with the necessary accuracy, no zone should be permitted to "mud up" during cleaning. Although jetting, or violent agitation of fluids against the walls should be avoided as much as possible. Hot fluids, heating devices, lye, carbide or other heat-generating agents should be used with caution even when these zones have been cased or packed off.

Other factors to avoid during primary cleanouts are: (1) prolonged testing periods, (2) unnecessary exposure to air or surface filth, (3) stirring of bore contents which encourages the formation of emulsions. Generally, after the bore has been cleared of sediment to its base, and the walls stand firm for 10 to 12 hours following several washdowns, the well can be brought safely into production. Casing shoulders, packer seats, etc., should be rechecked, however, to make certain that their location is not in porous media. New wells, after being subjected to precautionary measures rarely develop thief zones within the reservoir, and are generally capable of withstanding a rigorous production cycle, including repressuring practices utilized in secondary oil recovery.

Thieving by Unprotected Wells. Mistakes made in bringing an oil well into production are usually difficult to correct. Among the most stub-

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born problems encountered within the productive span is the repair of thief zones resulting from disruptive practices used during well completions. Where barren strata along a reservoir bore have been ignored and made porous by misguided processes, oil absorption initially begins with the first release of production, and is encouraged by: (1) pressure differentials within the bore, (2) head pressures resulting from wells being closed in, and (3) energy encroaching from input wells during secondary oil recovery. Since oil generally saturates the receptive media for several inches back of the bore face before the condition is noticed, identification of the thief zone becomes speculative unless an accurate drilling log of the well is available, or unless the reservoir bore has been charted by logging instruments prior to fracturing or acidizing. However, if the thief strata or stretches of bore can be located and measured as to length, the rate and volume of oil absorption can be slowed down considerably by the use of plugging agents. It is advisable under average field conditions to have such agents applied by service crews or other qualified personnel.

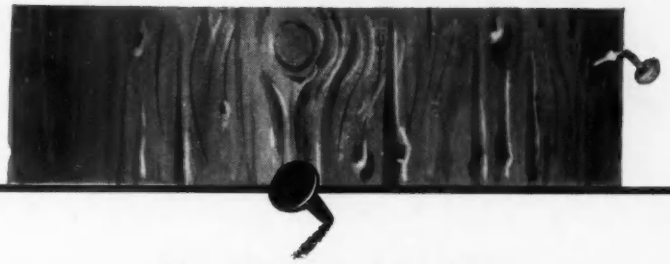
Among corrective measures most widely approved are: (1) plugging with plastics or resinous compounds applied under pressure, (2) applications of carbon dioxide (dry-ice), followed by immediate sprayings with cement slurry, and (3) alum packs, or fillings of aquagel, which are confined within the offending stretch of bore for 20 to 24 hours by means of bridges. The bridges usually are composed of materials which can be destroyed later with acids or other chemicals. In some cases, it is found necessary to use detergents, which cause the face, or oil-soaked surface of the media to crumble or scale off. The fresh bore face is then sprayed liberally with cement slurry or plastic compounds.

Where thief zones are located near the base of the reservoir, the most practical procedure is to plug the bore back to the lowest oil-producing horizon. A thief zone within the top portion of the structure can be generally cased off, or the tubing packers seated above and below it. Other measures which often give satisfactory results include: (1) sprays of heated paraf-

fin and (2) water injections, which cause the clay content of the media to expand and sets up so-called "Jamin actions" within the oil-saturated segments back of the bore face.

Wells which have developed thief zones within the reservoir should never be closed in under pressure for any extended periods. The common practice of back-flowing such wells should be avoided. It must be kept in mind that any pressure buildup within the bore will increase the volume of oil absorption within receptive zones. During the repressuring of a reservoir, this condition can, and often does occur within abandoned wells which were not properly plugged. This is a major reason why the reservoir-bores of all abandonments should be filled with non-soluble materials in connection with specified plugging practices.

The operator who boasts of an extraordinary thickness of a designated pay sand in his well implies apparently that every foot of the structure, from top to base, is productive. Unfortunately, this is rarely, if ever the case. Geologic computations show that anywhere from 5 to 30 percent or more of a petroliferous structure is non-productive media, much of which must be recognized as a treacherous potential. In some structures, the barren media occurs in the form of breaks or extensive layer partings which are readily identified when drilling the reservoir. In other structures the barren strata narrows into streaks or seams which are defined less clearly. The prevailing rule in all reservoirs regardless of depth however, is that barren zones are the nearest zero in resistance, being devoid of fluid. In the completion of new wells, it is therefore sheer folly to fracture, acidize, or otherwise process barren media, inasmuch as no additional oil is gained, and the risk of creating traps is extremely great, as is attested by the fact that hundreds, perhaps thousands of barrels of oil are lost annually in this manner. Lost oil at any point along the route of production represents a waste of tied up capital. But the situation becomes particularly unhealthy when it is permitted to occur within the physical confines of the reservoir.



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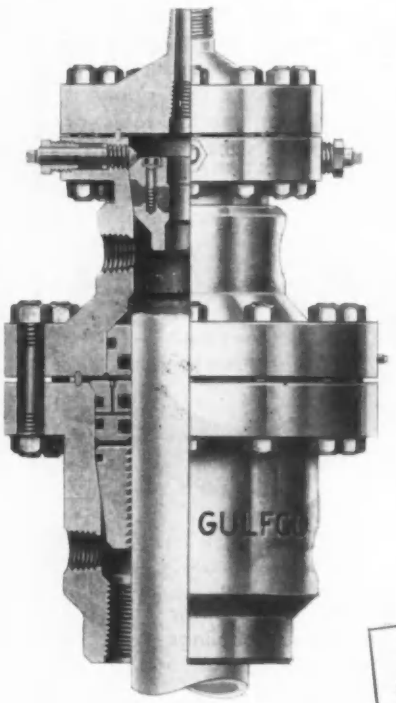
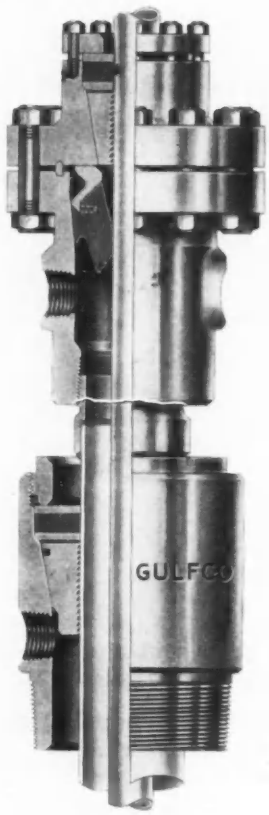
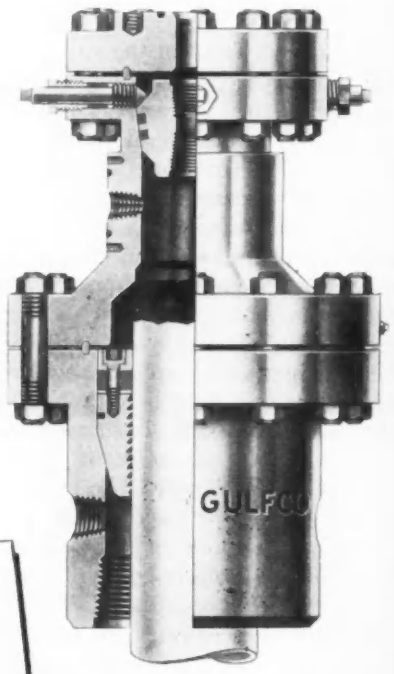


Type RS-4 Casing Head combined with G-2F Tubing Head Body, LA-2 Hanger, O-2 Seal and G-2T Adapter Cap.



Type CY Casing Head with Type CH Weld Nipple combined with G-1 Tubing Head Body and G-6 attachment.



Type RS-1 Casing Head combined with G-2F Tubing Head Body, T-2 Hanger and G-2S Adapter Cap.

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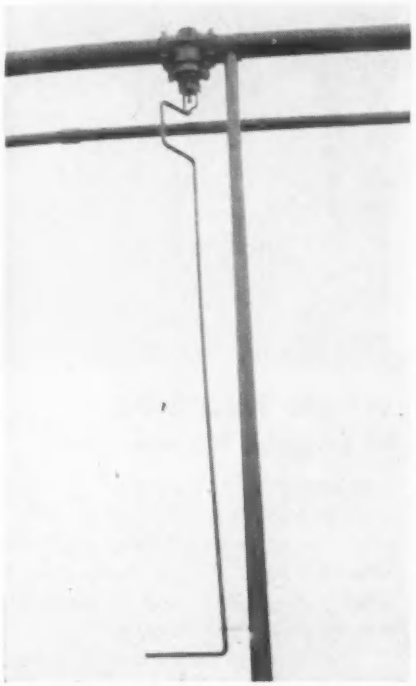
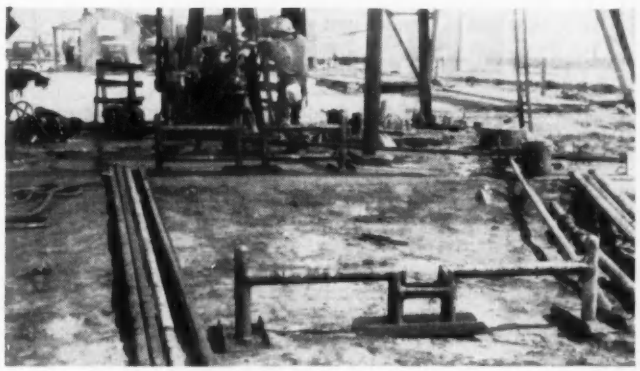


Valve Operated By Rod Handle

Operation of an elevated plug valve in a tank battery fill line can be made possible by inverting it and attaching a formed section of sucker rod. Paralleling the oil fill-up line is a tank vent line which makes it necessary to form a box shape in the rod so it can be rotated 90 degrees to close or open the valve. A vertical pipe support for the oil fill-up line is located near the valve which makes it useful in mounting a crank support at shoulder height. Make this support of a piece of strap steel about five inches long welded horizontally to the adjacent pipe and drilled at one end to accept the valve stem extension rod. A right-angle bend in the rod at the bottom enables the pumper to close or open the valve easily and quickly.

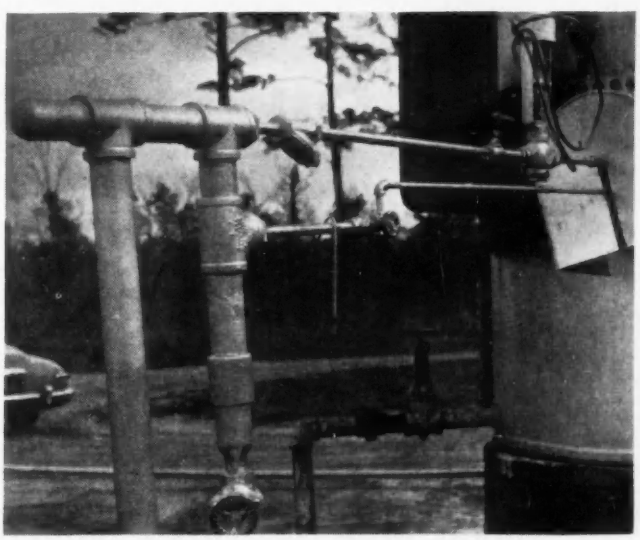
Portable Racks Support Sucker Rods



Two prefabricated racks carried on the pulling unit have been found useful in laying down sucker rods during pulling operations. The rack nearest the well head is about 12 inches higher than the second rack so that when rods are placed on them, the rod couplings are at an angle and can be picked up easily with the rod elevators.

Each rack is made from three-inch pipe mounted on eight-inch channel iron which serves as a base. Width of the rack is about nine feet and is supported by four short uprights, two in the center and one at either end. A center channel is formed in the rack so that each rod can be rolled to the middle of the rack when pulled up over the well prior to running in the hole. The outside legs extend above the rack level to prevent the rods from rolling off the rack. Thus supported above the ground, the rods are kept clean and are easy to work with.

Heater Pilot Has Fuel Scrubber



On remote tank batteries, it is essential that the automatically-controlled heater-treaters be equipped with positive acting burners. Since the flame at times may be extinguished, such as in hot weather when small amounts of fluid are flowing through the heater-treater, it is necessary to provide a pilot flame which lights the burner once the fuel supply is opened.

It is not difficult to install such a pilot line, but it is useful to take precautions to insure that the pilot never

goes out. Where very small volumes of gas are burned in the pilot, it is possible for sand, moisture or foreign material to clog the line and extinguish the pilot flame.

Precluding such an occurrence was the installation of a small drip chamber on the pilot line as illustrated. A two-inch tee terminated the larger pipe which brought gas up to the heater-treater, the line being bushed down to one-inch. A two-foot section of two-inch pipe and fittings was screwed into the tee which was turned so the added section pointed downward as shown. A swedge and valve was added at the bottom so that liquids and other foreign matter collecting in the drip could be blown out. Near the top of this vertical two-inch chamber a second tee was included so that the pilot line could be attached. This line was equipped with a valve which permitted manual regulation of the pilot flame. This simple precaution can eliminate considerable trouble that might otherwise be experienced should the pilot light be extinguished.

Wheel Step Aids In Engine Repair

A simple step to stand on to make it easy to repair truck engines may be made from materials on hand. This step has loops which hang over the front tire so that the mechanic can slip them in place easily.

The step is cut from a piece of floor plate approximately 10 inches by 20 inches. The remainder of the device is made from sucker rod material or bar stock. Two pieces, each approximately four feet long are bent in the same shape with a 90-degree bend at the bottom to fit the floor plate section. After the floor plate section is welded in place and the matching loops made at the top, a brace rod is welded across the middle which serves as a handhold in putting the device on and taking it off the front tire.

This step makes it possible for the mechanic to reach the engine without having to hang over the front fender with his feet off the floor when servicing large trucks.

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HERE'S A SNAPPY CONVERTIBLE

BIW PX-350 Stripper Type Tubing Head

The BIW PX-350 is an efficient and economical method for suspending tubing on completion and, later on, for working over the well or putting it on pump. The Tubing Head can be converted readily into a threaded hanger suspension-type tubing head, a slip suspension-type pumping head, or it can be equipped with a gas lift hanger.

Figure 2 shows the construction of the heavy duty Neoprene stripper. This stripper permits running and pulling tubing without the use of additional blowout preventer equipment. The one piece rubber packoff is molded into a steel spider ring to prevent stripper motion while the tubing is being raised or lowered. Tubing collars are passed readily; well pressure is sealed in effectively.

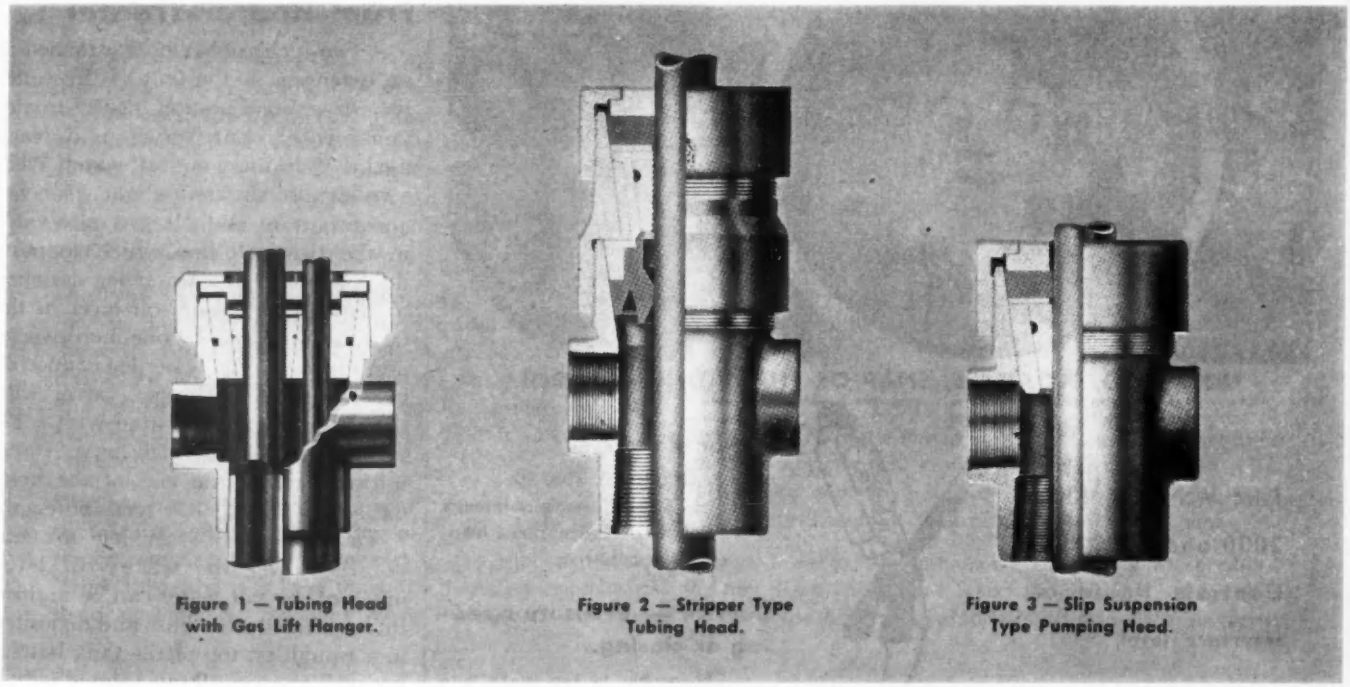

Figure 1 — Tubing Head with Gas Lift Hanger.

Figure 2 — Stripper Type Tubing Head.

Figure 3 — Slip Suspension Type Pumping Head.

The head, as shown in Figure 1, can be converted to a gas lift head by removing the stuffing box assembly, slips, slip bushing, slip bowl, and stripper assembly, and substituting a gas lift hanger. The gas lift hanger utilizes slips for suspension or the gas pipe and is threaded for the tubing connection.

The ease of conversion to an efficient pumping head is shown in Figure 3. The stripper assembly and slip bowl are removed. The slip assembly is seated in the body of the head, and the stuffing box is made up on the body of the head instead of on the slip bowl.

Every day for years this head has been proving itself in economy and long life in East Texas and in the Permian Basin. Find out the other important advantages that cut costs all during the life of the well.

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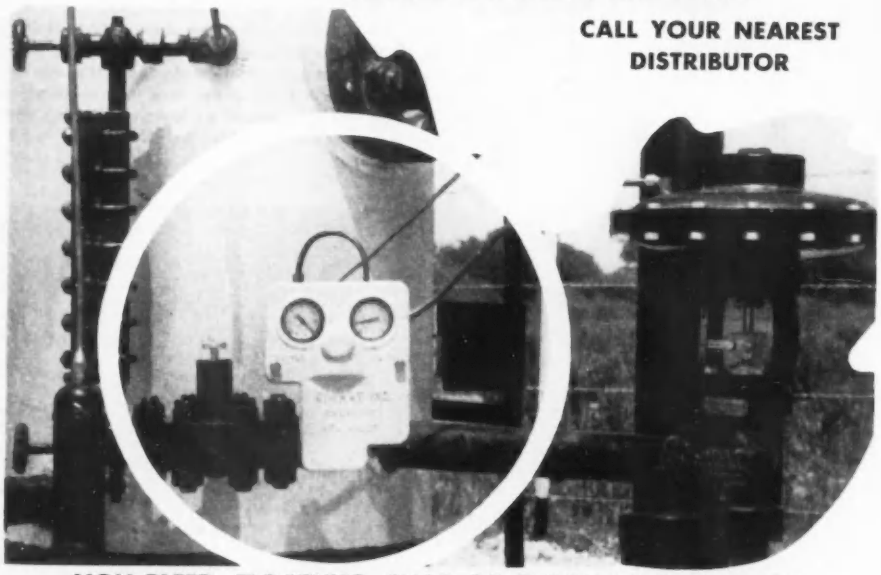

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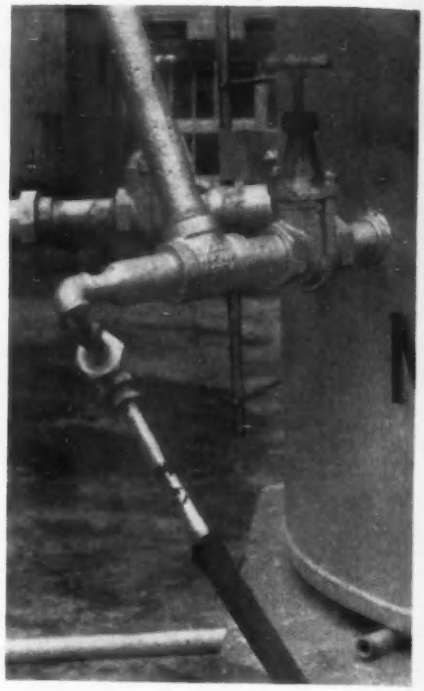


Hose Drains Water From Heater-Treater

A two-inch rubber hose attached to an extension at the foot of the water leg on a combination heater-treater gun barrel tank serves as a ready means of draining out salt water. Weld a collar into the tank about 20 inches above bottom and place a gate valve in the two-inch line which supports the lower end of a water leg designed to regulate the water-oil level in the tank. Screw a two by one-inch swedge into the tee on the water leg connected into a small globe-type valve, with the downstream side fitted with a 12-inch nipple of one-inch pipe. Insert the nipple into the end of the hose, measuring about 100 feet in length.

To drain the water leg to temporarily lower the water-oil level, much of the salt water can be drained through the rubber hose and deposited in a trough on top of the tank battery fire wall or to small pits located within reach of the hose. In normal operation, the water leg carries the produced and separated salt water into a disposal system on which some back pressure is maintained so that oil will be forced from the combination heater-treater and gun barrel into the stock tanks.

● If you're not visiting the International Petroleum Exposition in Tulsa this month, do the next best thing . . . read the Exposition Section in this issue of WORLD OIL. Page 299.

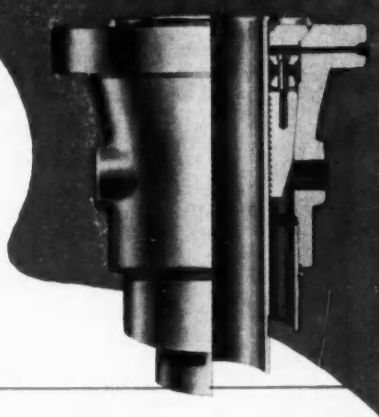
RECTOR SLIP PACKOFF ASSEMBLY

for Type RH Casing Head

...lowers through blowout preventer

...seals before preventer is removed

...sets and seals simultaneously



Rector Type "RH" Casing Head with Type "SP" Slip Packoff in position. Standard Rector Welding Ring and API ring gasket are used in the usual manner to provide the famous Rector metal-to-metal seal.

The Type "SP" Slip Packoff Assembly gives the operator everything desired in a casing head setting and sealing arrangement. It provides the safety and convenience of setting casing without removing the Blowout Preventer, plus the permanent, leak-proof advantages of the famous Rector metal-to-metal seal . . . a good weld, plus API Ring Gasket.

The Type "SP" Slip Packoff is wrapped around the pipe, latched and lowered through the Blowout Preventer into the seat in the Rector RH Casing Head. Special floating ribs in the slip segments contact the casing head bowl and hold the slips in position to assure positive engagement of slip teeth with the casing as it is lowered for final setting.

The compressible sealing element directly above the slips has a bottom retainer ring attached to the ribs. An upper retaining ring is attached to the slips by Allen Head Bolts. The ribs hold the bottom retainer ring in a fixed position. As the slips move downward with the pipe, the sealing element is compressed by the upper retainer ring, which moves downward with the slips. This effects a positive seal at the same time the setting is made and without removing Blowout equipment.

Ask your Rector Representative or Supply Store about the new Type "SP" Slip Packoff Assembly. It is available for our Type RH Casing Heads in all popular pipe sizes.

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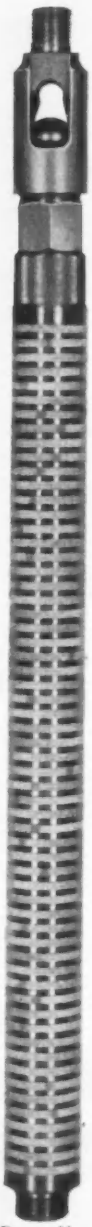
Sliding Gate Made of Sucker Rods

Two sets of parallel rods mounted inside supporting pipe sections form a lightweight, easily-operated lease gate. Considerable saving is accomplished by incorporating the gate in a cattle guard crossing as shown.

Made from salvaged pipe and rod material, the sliding gate is welded together in the shop and simply bolted to the cattle guard. Two separate but identical parts form the gate. Two parallel sections of salvaged sucker rod material are welded to form a parallelogram, measuring about 15 feet long and 18 inches wide. This framework is supported by two parallel and horizontal sections of 1½-inch pipe attached to the guard side railing. Form this side section from three-inch pipe in a triangular shape and support it by a vertical leg of four-inch pipe. Weld the horizontal supporting pipe to the center brace in the triangle frame and to the vertical leg.

In the center of the cattle guard make a pillow block from a short nipple of four-inch pipe mounted upright and welded to the center cross piece of the guard. This block is the center catch for both rod frames when they are brought together to close the gate. A chain and lock secures the gate to unauthorized vehicles. When not in use, the gate can easily be shoved out of the way for full clearance on either side of the road.

BETTER EQUIPMENT REDUCES COST!



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Patent No. Re20574

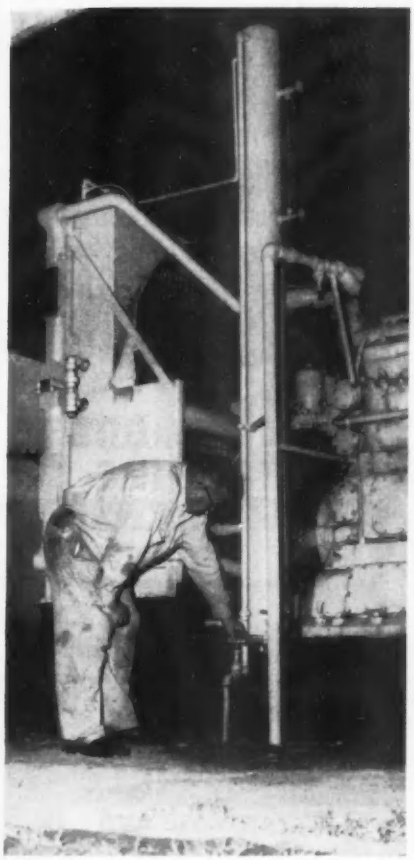
Riser Simplifies Engine Oil Check

When it is necessary to shut down a well to check the oil, damage may be done if sand conditions are serious in the well. A short shutdown may cause the sand to settle around the bottom-hole pump and cause a pulling job with loss of production and damage to the well.

To simplify checking the oil when the engine is in motion, a ⅜-inch diameter line can be installed from the drain plug on the engine to the side which is most accessible. A riser is attached so that it extends about six inches above the normal oil level. A

tight-fitting cap to which has been fitted a welding rod for a drip stick is added. This rod carries the same markings as the standard drip stick and since there is no motion inside the pipe, the oil can be checked with the engine running.

This device also allows the side of the engine away from prevailing winds and the sun to be left uncovered to help the cooling system and make it more accessible for other operations.



Radiator Chamber Is Easily Filled

An external radiator chamber that adds additional water capacity makes it possible to keep the water level in the two vessels at the required level without the aid of a water hose. The external vertical chamber also provides additional cooling.

The chamber is made from a section of 10-inch casing about 14 feet long welded closed at bottom and top. It is mounted to the left and about four feet behind the radiator on this large engine which powers a gas compressor. Water from the radiator enters the lower part of the vertical chamber near the bottom where a 1½-inch line is welded to the 8-inch casing. An overflow line of ½-inch

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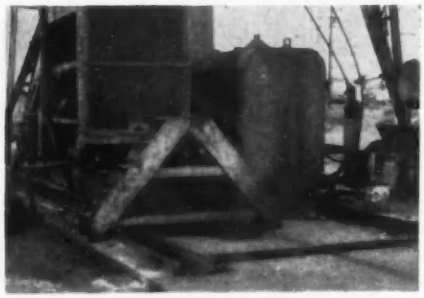
BARTLESVILLE, OKLAHOMA

diameter carries water from the chamber into the radiator fill line. A glass gauge is mounted near the top of the water chamber to indicate the water level in the casing chamber. A water supply line is connected into the chamber and equipped with a gate valve at the bottom. As the water level drops, it is a simple matter to refill the chamber to a desired level.



Pumping Unit Made Portable by Rails

Channel iron rails mounted in the concrete foundation surrounding a well simplified the job of removing the hydraulic pumping unit for working over the well. The heavy pumping unit was mounted on I-beam skids as shown. Instead of bolting this unit in place on a concrete foundation, channel-iron rails were bolted to the concrete pad and spaced to serve as runners for the skid members. Size of the channel iron was at least one inch wider than the web of the I-beam to provide ample space for the skid runners.

The channel iron rails were spaced at three points by means of a heavy steel rod that was welded to the inside edges of the channel. Flanges welded to the channel made it possible to bolt the runners in place by means of bolts that had been grouted in the concrete.

During workovers, or when the well had to be pulled, it was necessary to move the hydraulic pumping unit out of the way to allow ample working space around the well head. A winch truck was backed up to the unit and chocked. A winch line was attached to the unit that had been disconnected from the well and fuel lines. By engaging the winch clutch, the pumping unit was slowly dragged about six feet away from the well. When the workover or pulling job was completed, the pumping unit was positioned by parking the winch truck out in front of the well and winching up the unit in place.

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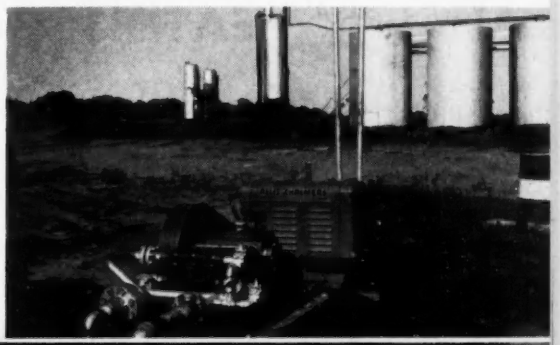


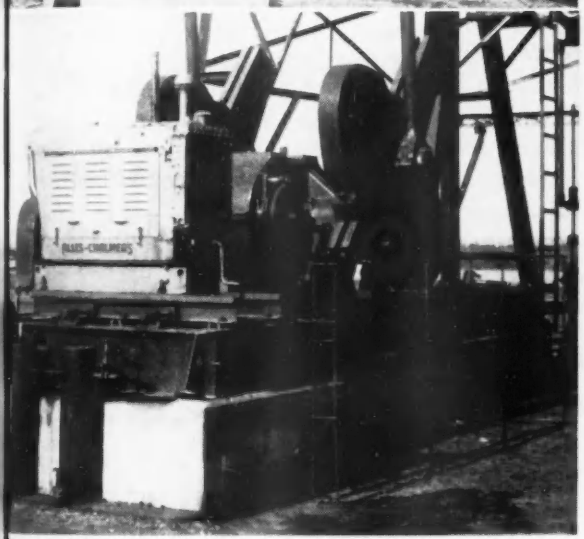
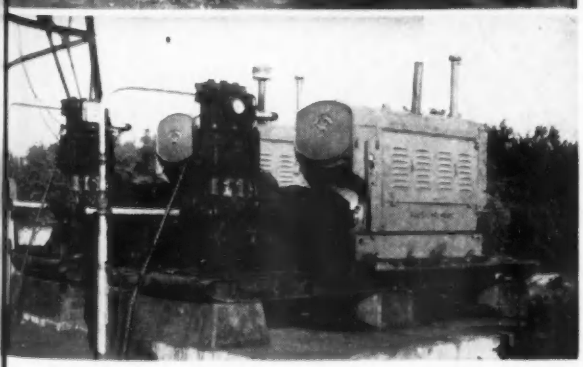


Photo courtesy of Deep Rock Oil Corporation



EIGHT YEARS of continuous *24 hours* a day service before requiring an overhaul. A tribute to *good lubricants* and a good engine.

This Allis-Chalmers W-201 Engine, on Deep Rock Oil Corporation's Blackburn B-#1 at Fairfield, Illinois, ran more than 70,000 hours before overhaul.

COSTS LESS to repair. After this long period of service, the crankshaft and bearings were still in good condition.

Compare Allis-Chalmers repair parts cost with those of other engines of equivalent size. You'll be surprised at the lower cost.

1. Model B Engine on Gaso pump at Elmore City.
2. Model W-201 pumping from 3000' at Wewoka.
3. Model U-318 on 4100' well at Holdenville.
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Shopmade Rig Rethreads Bolts

To chase the threads of many bolts used and reused around a lease, such as the bolts used on standard rigs, a simple rig may be used. It consists of a bench mounted automobile transmission with an electric motor mounted below to drive the transmission. A small wheel on the motor shaft and a larger one on the transmission are connected by a V belt to cut down the speed and increase the power.

The drive shaft end of the transmission extends over a small table on which is mounted a jig to carry any size of bolt die. This die can be turned at three forward speeds and one in reverse. However, the low and reverse speeds usually are employed. The bolts are sorted and stacked beside the small table and the operator merely thrusts the bolt through a hole with a stop to catch the head of the bolt. The transmission is then pulled back into low gear with the electric motor running and the threads chased in a few seconds. As soon as the thread is run down, the transmission is thrown into reverse and the die backed off. The same process is repeated on the next bolt.

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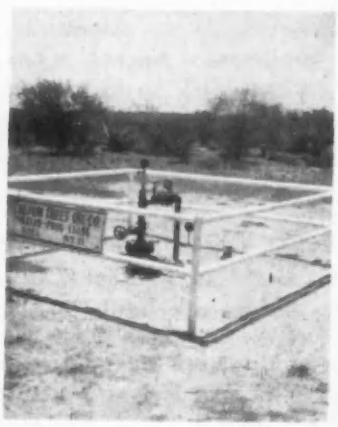

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DESIGN
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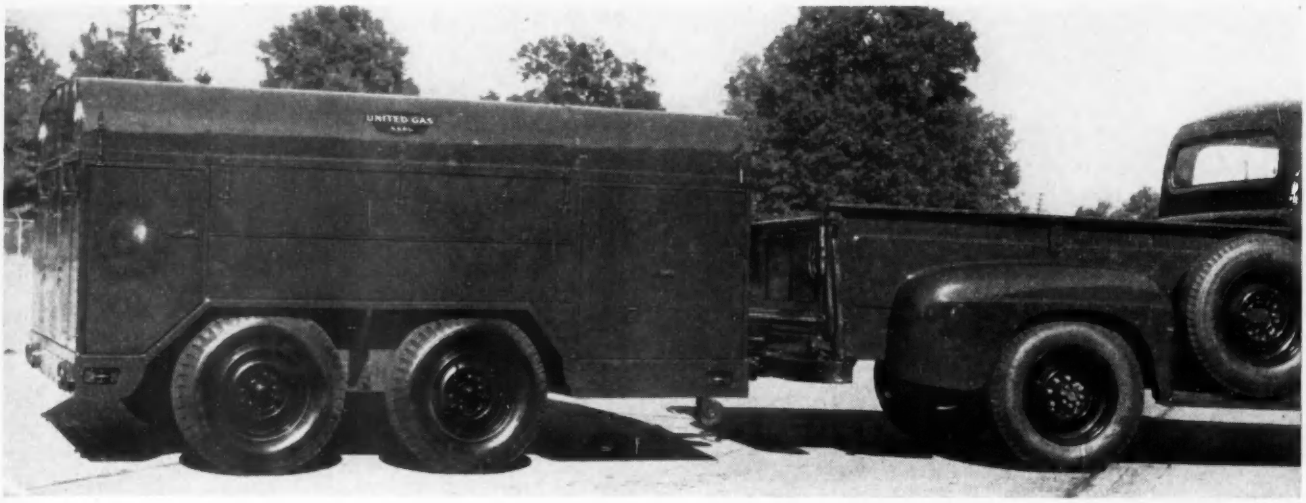


Compact and rugged, two custom-made trailer units such as the one shown here are now being used by United Gas Corporation for dehydration plant repairs.

mobile units now being used for dehydration plant repairs

To SERVICE SOME of the new, larger type dehydration plants in operation in the system, United Gas Pipe Line Company is using two custom-made, mobile repair units.

The traveling units are housed in heavy, four-wheel trailers and are equipped to do any dehydration repair work, including overhaul. They carry four-man crews consisting of a foreman and three specialists in various types of repair and maintenance work.

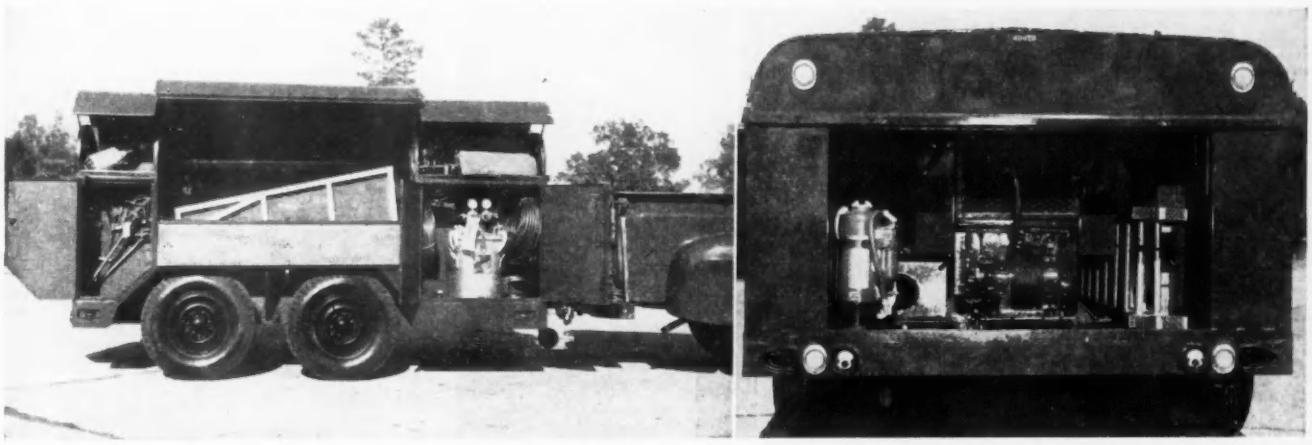
One unit is stationed in the New Orleans district, and the other handles all work for the Houston-San Antonio area.

Complete machine repair units on wheels, they have built-in air compressors to drive the impact wrenches, air hoists, air-driven winches and certain other machine equipment, as well as operate spray painting gear, etc. An automatic hopper device is included in each unit to load and unload desiccant (drying) beds, and screens are provided to screen the material when replacing a desiccant bed.

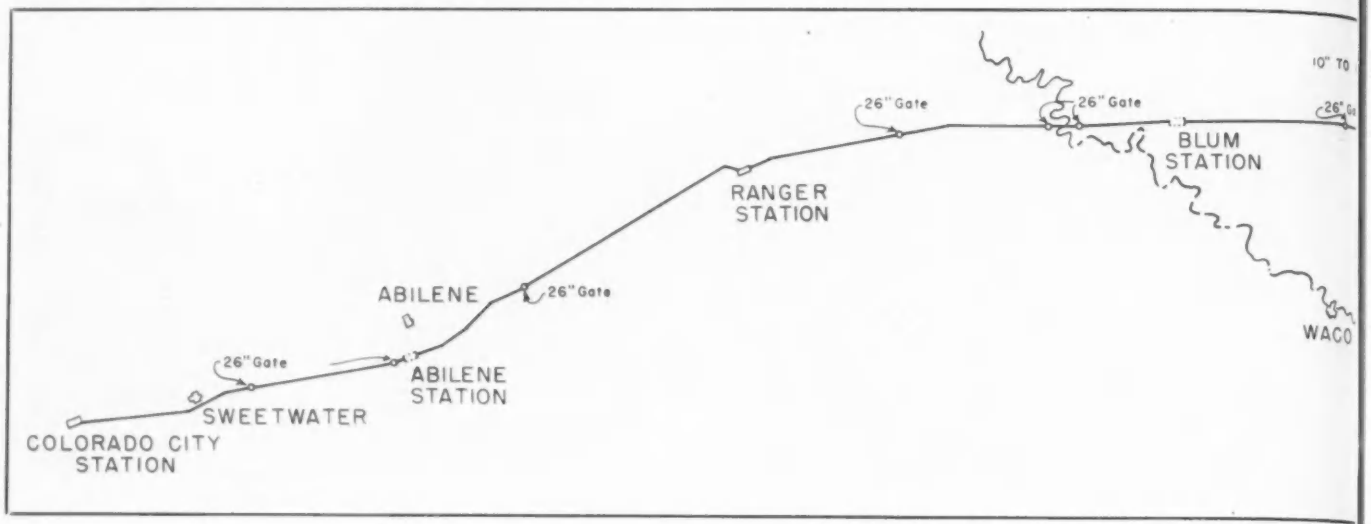
Other equipment includes all sorts of handtools, floodlights, collapsible aluminum ladders, etc.

Safety features include electric brakes, emergency lights, turn indicators and fire extinguishers. The units were built in Shreveport, La.

Photographs and story courtesy *United Gas Log*



Visible in side compartments (left) are screens to screen desiccant beds and spray painting gear. An air-driven winch (right) is installed in rear section of trailer. The units have their own built-in air compressors.



North America's Largest Crude Oil Line

300,000 barrels per day is moving through West Texas Gulf's 26-inch, 579-mile common carrier from Colorado City, Texas, to the Beaumont area.

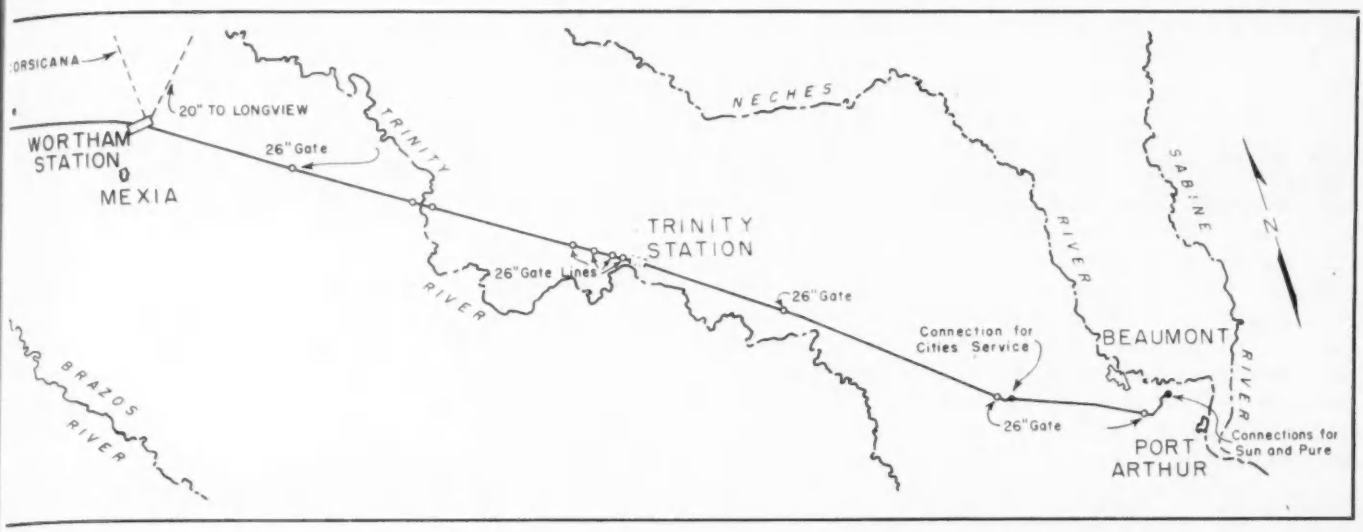
Dust such as this was one of the tough problems that had to be overcome in the building of the West Texas Gulf line.

CRUDE OIL IS moving at the rate of 300,000 barrels per day through North America's largest diameter and greatest capacity, crude oil pipe line that links the oil reserves of the Permian Basin in West Texas with the shipping and refining areas of East Texas, the Ohio Valley and Great Lakes Area. The line is West Texas Gulf Pipe Line Company's new 26-inch, 579-mile-long common carrier. It runs 466 miles from Colorado City, Texas, to Nederland, Texas, near Beaumont with a 20-inch, 112-mile long spur running from the Wortham station to Longview, Texas.

Even as operations of the system commenced, work was under way to increase the line's capacity through addition of three booster stations. When they go on the line next fall, the system will have a capacity just under 400,000 barrels a day. And engineers figure the line's ultimate capacity near 440,000 barrels of crude each day.

This early expansion of the line reflects the blotter-like action of the U. S. in absorbing crude oil from West Texas. For example, the crude that the line delivers to Longview, feeds into Mid-Valley Pipeline Company's system for transhipment to northern refineries. Part of the crude that the line delivers to the Beaumont area ends up as finished products in other sections of the nation.

Five Companies. Five oil companies with sizeable holdings in West Texas



Strip map of West Texas Gulf Pipe Line Company's 26-inch, 579 mile crude line from Colorado City, Texas, to Nederland, Texas.

Is Now in Operation

Work already under way to increase the capacity through addition of three booster stations. Ultimate total to be near 440,000 barrels daily.

own undivided stock in this pipeline venture. They are—Gulf Refining Co., Standard Oil Company (Ohio), Sun Oil Company, Pure Oil Company and Cities Service Company.

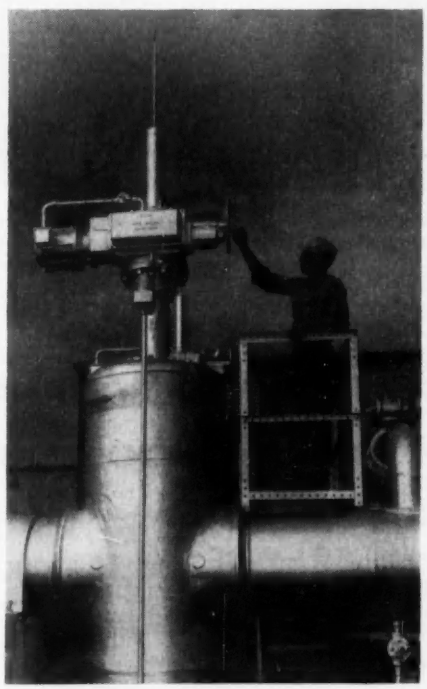
The system affords big line economies for less than the cost of a number of small-inch pipe lines. One of the most important savings this big-inch system offers over several individual small systems is more economical pump station operation. Its three powerful, all-electric, semi-automatic stations require no larger crew than would lesser stations.

West Texas Gulf's first station is located in Scurry County near Colorado City. A number of pipe lines converge on this station bringing in the four grades of crude that comprise the cargo of the system. These crudes are: Scurry, Semi-Sweet, Ellenberger and Sour. The biggest of these feeder lines coming into the Colorado City station is the 24-inch Mesa line system that runs from Midland, Texas, and in the heart of the Permian Basin.

The second pump station is at Ranger, Texas, 132 miles from Colorado City. And the third station is at Wortham, Texas, 142 miles down the line. At this last station the system branches in two directions. A 20-inch runs 112 miles to Longview and a 26-inch runs 192 miles to Nederland. By developing 825 pounds per square inch on the Longview line, the station can pump 140,000 barrels per day; and, at the same time it can pump 231,500 barrels per day by discharging at 750 psi into the Nederland line. While this is going on, the station can pump about 50,000 barrels a day to nearby Corsicana. This adds up to more than 420,000 barrels a day.

System Design. The Gulf Refining Company is the new pipe line system's largest stockholder. And upon the shoulders of its engineers and operators fell the task of designing and supervising construction of the line, as well as its subsequent operation. J. L. Irvin, Gulf's general manager of pipe line operations, headed up this task. The aim was to design and construct a pipe line in keeping with up-to-date, modern pipe line practices.

Except for its unusual size, the entire system is conventional. Good construction practice was followed throughout the job. The ditch for the 26-inch line was excavated 42 inches wide; and ditch for the 20-inch line.



Large valve at Wortham Station can be operated by push buttons in control room or at point near valve.

was excavated 32 inches wide. Depth of the ditch in all cases provided for 24 inches of cover. At road crossings, highways, railroads, creeks, rivers, ravines and other water courses, irrigated lands, farm terraces, drainage tile and at points where contour of the earth required extra depth, the ditch was excavated deeper to comply with good pipe line laying practices.

In rock sections, the ditch was excavated (by ditching machine, rock plows, explosives and back hoes) to a depth to provide a minimum of 12 inches of cover with 4 inches of sand or earth padding underneath the pipe.

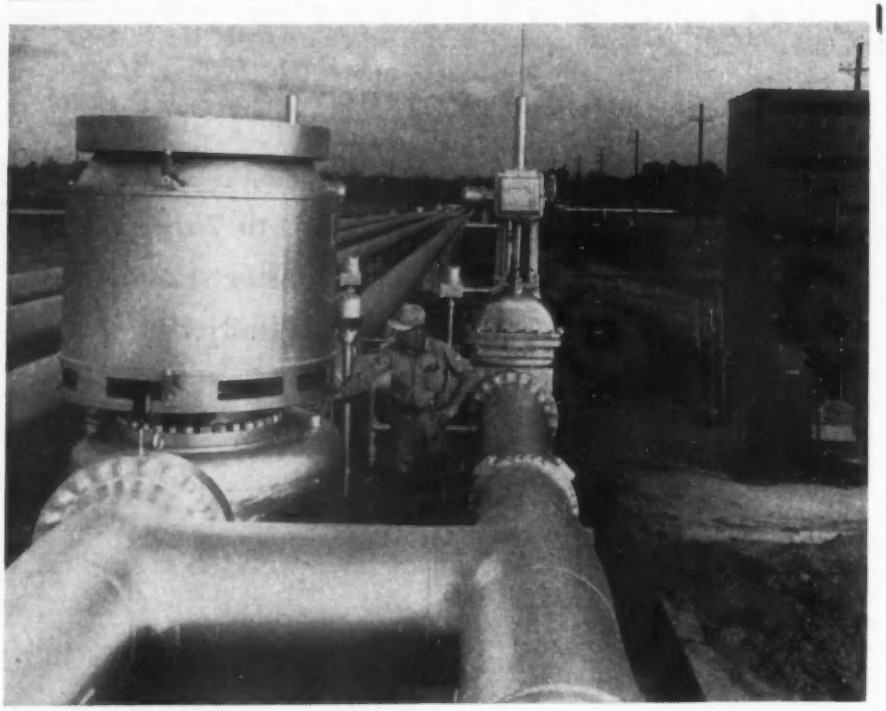
The entire line was coated with cold primer followed by a single flood coat of coal tar enamel to a minimum thickness of 3/32-inch. A spiral wrap of glass fiber was pulled into the enamel and was followed by a spiral wrap of 15-pound coal tar saturated asbestos felt. At stream crossings and through casings, a second coat of enamel was applied between the glass wrap and the felt.

The 26-inch section of the line crosses the Brazos and Trinity rivers and the 20-inch line crosses the Trinity and Sabine rivers. The line crossed the rivers in a straight section with a minimum of four feet of cover. Sags were placed well back in the bank for anchorage—emerging from the stream at a rise of 1 in 5 feet. Banks were restored as near as possible to original condition and sand bagged where erosion seemed likely.

Most of the 26-inch line pipe was 5/16 wall, weighing 85.73 pounds per foot with 52,000 and 46,000 pounds yield. In high pressure areas, 11/32 wall pipe weighing 94.19 pounds per foot with a yield of 52,000 pounds was used. At the lower end of the line near Nederland, ¼-inch wall pipe, weighing 68.75 pounds per foot with 52,000 pounds yield was used.

All of the 20-inch line was constructed of 5/16 wall, pipe weighing 65.71 pounds per foot with a yield of 46,000 pounds.

Approximately 10 percent of the welds were X-rayed except in casings and stream crossings where all welds were X-rayed.



A 250 horsepower booster pump which turns at 750 revolutions per minute. L. E. Davis, district electrician stands by one of the 11 booster pumps in tankage area. Pump and valves can be operated from control room. Note switch gear at right.

. . . . the U.S.' most powerful crude oil line pump station

THE WORTHAM (TEXAS) pump station on West Texas Gulf Pipe Line Company's new 26-inch pipe line is the most powerful crude oil pipe line pump station in the U. S. It is an all-electric station the size of which can best be judged by the fantastic amount of wiring that went into its construction. The station has more than 360 miles of electrical wiring!

Reason for Demand. Explanation for this heavy demand is apparent after a glance at West Texas Gulf's system map. The Wortham station is situated at the point where the system diverges for deliveries to three distant points. With a single 26-inch line feeding it, the system has an outgoing 26-inch line running to Nederland, Texas; a 20-inch line running to Longview, Texas, and a 10-inch Corsicana, Texas, line. This means that the station must in effect, be 3-in-1.

The station's prime movers are 10 high-horsepower, slow-rotating electric motors. They have a total of 8750 horsepower. In addition, the station has 11 booster pumps in the tankage area with a total of 2750 HP, bringing the station total to 11,500 HP. Prime movers on the 193-mile-long 26-inch Nederland line consist of one 800 HP and three 1500 HP forced draft ventilated, totally enclosed, 4160-volt, 3-phase, 60-cycle, 1780-revolutions-per-minute motors. They drive one 16-inch, single-stage, double-volute, double-suction centrifugal pump and three 16-inch, two-stage, double-volute, double-suction centrifugal pumps.

Prime movers for the 20-inch 112-mile-long Longview (Texas) line are one 500 HP and three 1000 HP forced draft ventilated, totally enclosed, 4160-volt, three-phase, 60-cycle, 1780 rpm electric motors. They drive one 12-inch single-stage, double-volute, double-suction centrifugal pump and three two-stage, double-volute, double-suction centrifugal pumps.

Prime movers for the Corsicana outgoing line are one 250 HP and one 500 HP forced-draft-ventilated, totally-enclosed, 4160-volt, three-

SAFETY...first and fast

THIS team of Caterpillar D8 Tractors with MD8 Pipe Layers is lowering in 26-inch gas line near Greenville, Miss. On another stretch near here these husky machines, which are owned by H. C. Price Co. of Bartlesville, Okla., crossed three-quarters of a mile of flooded rice field in only two hours. That was real speed, but it was made with full regard for the safety of the pipelaying crew.

Accuracy of control is vital in this work. The Cat* MD8 Pipe Layer has separate brakes and clutches on both boom and load line drums. Conveniently placed operating controls and a special, heavy-duty Caterpillar transmission mean precise placement of the pipe—and "built-in" safety for the men on the job.

The Cat D8 Tractor and MD8 Pipe Layer are a mighty combination. They have the balanced weight and power, the surefootedness in sticky going, the *muscles* to stay on the job with a minimum of maintenance. The long-wearing Diesel engine in the D8 develops an honest 148 HP, on low-cost No. 2 furnace oil.

Many spreads have standardized on Caterpillar equipment. They find, no matter where their jobs take them, that they can count on fast service from skilled Caterpillar Dealers.

Ask your nearby dealer for an on-the-job demonstration of Caterpillar track-type Tractors and Pipe Layers that fit *your* requirements.

Caterpillar Tractor Co., Peoria, Illinois.

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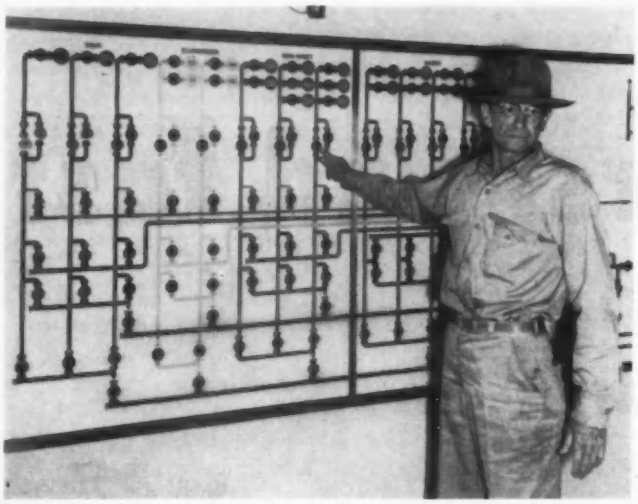
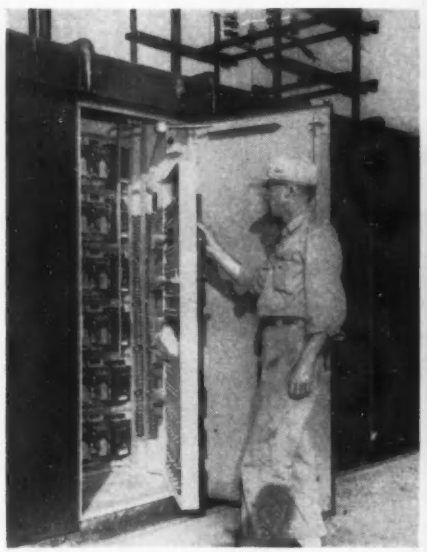
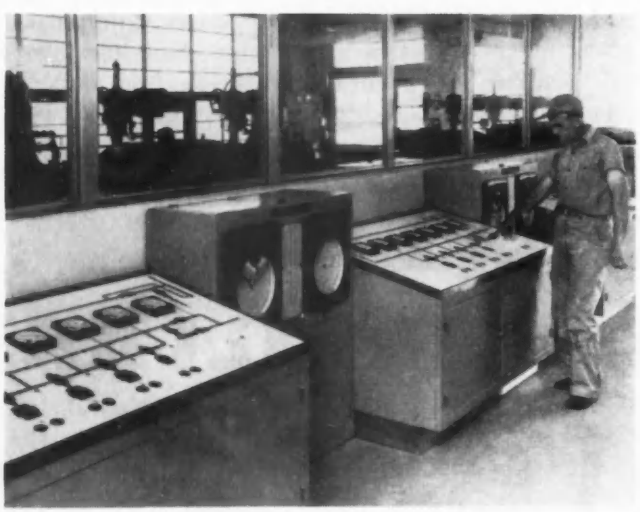


Tank farm and manifold control panel at U. S.' largest crude oil pipe line pump station. F. C. Deck, station foreman, points to indicator light denoting open valve on line. Station's 22 tanks can be controlled from this panel.

Rear of tank farm and manifold control panel. More than 2000 control wires feed into this panel. There are 38 from each of the 11 booster pumps in tankage area. Here C. J. Modisette, station engineer, checks wiring.

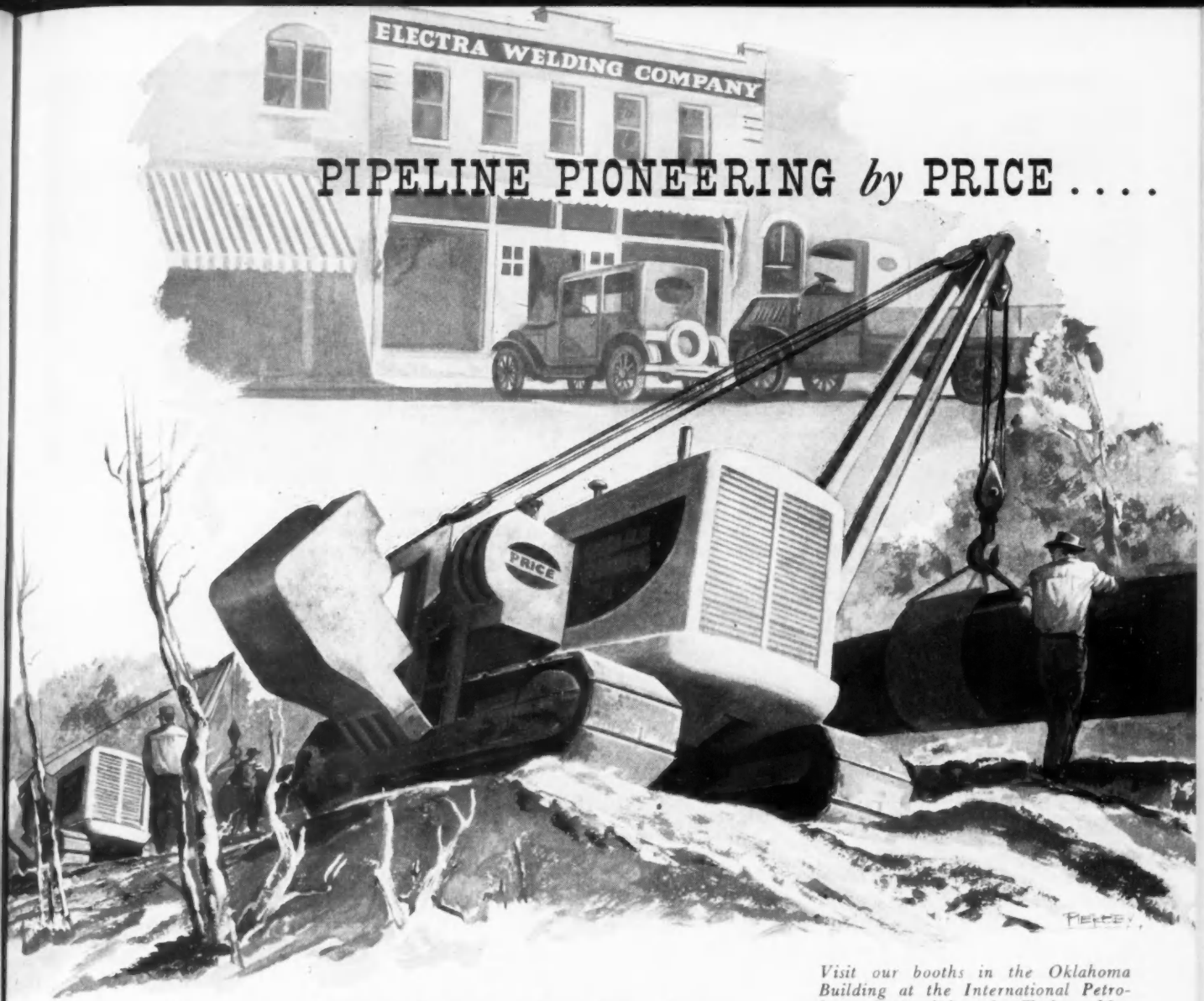


W. L. (Boots) Deshazo, (left), station superintendent who served as chief inspector during construction of the giant station, points to selector switch that enables operators to read the level in any one of the station's 22 tanks correct to ⅛ inch. Electronic gauge also has low and high level arms for each tank. Instrument to Deshazo's right is incoming flow meter. Bottom gauges are instrument air. More than 550 conduits stub up under these cubicles in the control room (center). Some 360 miles of wiring! That's the problem of L. E. Davis, district electrician, shown on the right checking outdoor switch gear. This assembly measures 19 feet long, 7 feet wide and 7 feet tall.



Three consoles control pumps at station. Here Station Engineer Modisette checks operation of pumps that can be seen in background.

Operator Jim H. Gant checks amperage on one of main pumping units on cubicle. Voltage on the motors is 4160.



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Electric welding was in its infancy when Harold C. Price established the Electra Welding Co. in 1921 with a single welding machine and two employees. The electric welding of large oil storage tanks marked the company's first success. In 1928, H. C. Price Co. electric welded a 263-mile oil line and was in the pipeline business for good. It became the world's largest pipeline contractors. Then came the Big Inch and Little Big Inch . . . the Canol Project . . . the Biggest Inch and Toughest Inch . . . and many more. Today, after 31 years and 22,000 miles of pipeline achievement, H. C. Price Co.'s reputation for dependability has established it as "America's Foremost Pipeline Constructors." And, as it views the future, HCPCO looks forward to the opportunity of even greater service to the oil and gas industry.

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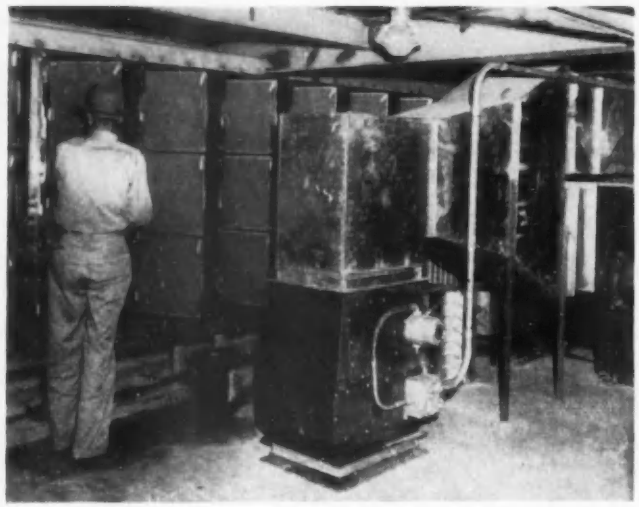
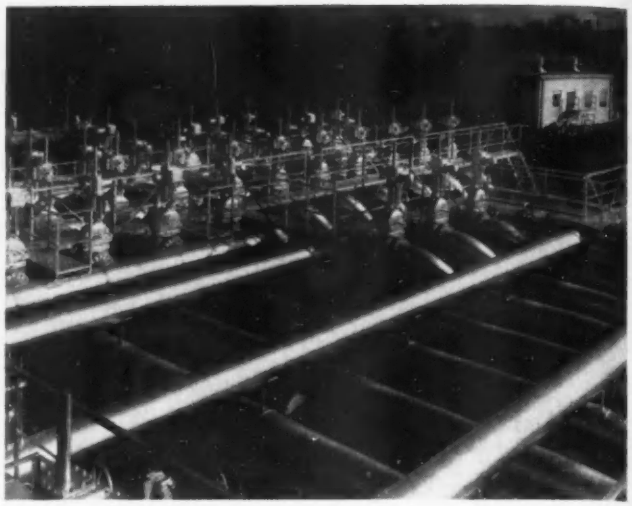


Thirteen blowers are located on second floor of pump station. Six of the blowers are 5 HP, 5 are 3 HP and 2 are 1½ HP. They ventilate motors and pressurize control room. All take suction from bank of filters at wall.



Manifold is push-button operated. All of the valves at the station can be operated three ways—by pushbutton from the control room, by push-button at switch near valve and by manual crank on top of valve.

phase, 60-cycle, 3600 rpm motors. They drive one six-inch, single-stage, double-volute, double-suction centrifugal pump and one two-stage, single-suction centrifugal pump.

Power for the station is purchased. Incoming feeders carry 66,000 volts to the transformer bank. At this point the current is converted into 4160 volts for use at the plant. The transformer bank is rated at 10,000 kilovolt-amperes.

One of the unusual features of the station is that all electrical equipment except pressure gauges was made by the same manufacturer. This goes for the control panels, cubicles, transformers and prime movers. The advantage of this feature is that equipment would fit together, and the manufacturer could be better saddled with responsibility for future performance of his products.

One of the control panels inside the pump building provides push-button operation for the entire tank farm. Valves at the tanks, booster pumps, and tank farm manifold valves can be operated from the board. And a signal light system on the board gives position of valves and signals when pumps are operating. These controls are so extensive, that 38 wires had to be run from the board to each one of the 11 booster pumps.

Three consoles in the control room are used in controlling the pumping operations. These controls are extensive and interlocked for maximum safety and ease of operation. For example, pumping units will not come on line until the cooling fans for the unit are in operation to insure the purging of the ducts before the unit motor starts. The suction residual pressure setting allows the suction gate of the pump to open with the discharge gate remaining closed until pressure in the pump has built up, at which time the discharge gate opens allowing the stream to pass to the next pump or to the main line depending on the number of units in operation. This starting sequence is typical of all of the pumping units.

These same consoles serve as annunciator panels for hot bearings, high case pressures, low pump suction pressure, high outgoing line pressure, high motor temperature. These alarms are actuated by mercury switches. They alarm before shutting down the pumping unit.

Other Instrumentation. The tank gauges are electronic type with transmitters and receivers. They have high and low level alarms. In the control room it is possible to watch the filling or emptying of any one of the 22 tanks, reading in inches or in feet. The smallest unit on the scale is in ⅛ inches.

Flow controllers and pressure controllers are pneumatically-operated control valves. Like all valves at the station, they can be manually operated in the field.

Pump Building. The first thing the casual observer notices when he goes inside the control room in the pump station, is the lack of noise. The faint hum of control room ventilating air is the only audible sound. The pumps which can be seen through the glass partition that makes one wall of the control room revolve at slow enough speeds to eliminate the scream so often associated with centrifugal pumps.

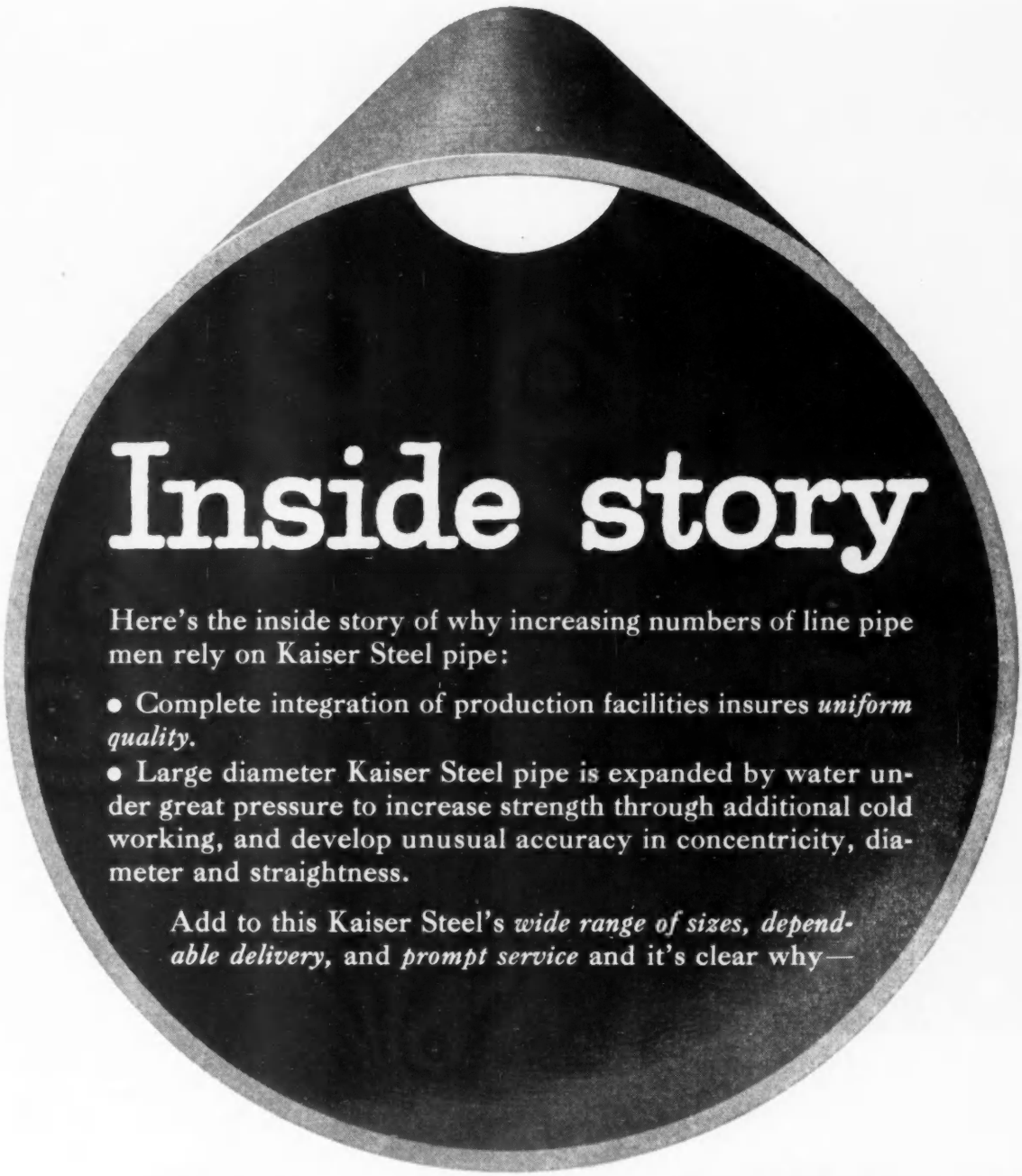
The building is of conventional design, with approximately 20-foot high walls. The top story is a ventilating fan room with six 5 HP blowers, five 3 HP and two 1½ HP, making 13 blowers in all. Two of these are for pressurizing the control room, ten are for ventilating the motors and one is for standby.

The crew for the new station was almost wholly supplied from a diesel-powered station that had been in operation for about 25 years.

the next best thing

to a visit to the International Petroleum Exposition in Tulsa, May 14 to 23, is your May issue of WORLD OIL. The special Exposition Section starts on Page 297 of this issue. There are pictures and descriptions of the latest in equipment which will be displayed at the Exposition. The items are conveniently indexed on pages 300 and 301.

• The convenient Reader Service Postcards are on pages 315 and 316. Use these postcards to obtain more information on the new products described in this issue.



Inside story

Here's the inside story of why increasing numbers of line pipe men rely on Kaiser Steel pipe:

- Complete integration of production facilities insures *uniform quality.*
- Large diameter Kaiser Steel pipe is expanded by water under great pressure to increase strength through additional cold working, and develop unusual accuracy in concentricity, diameter and straightness.

Add to this Kaiser Steel's *wide range of sizes, dependable delivery,* and *prompt service* and it's clear why—

It's good business to do business with

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KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	8⅝" to 20" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅛" to 12¾" O.D.	Up to 55'	.188" to .375"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	22" to 30" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser

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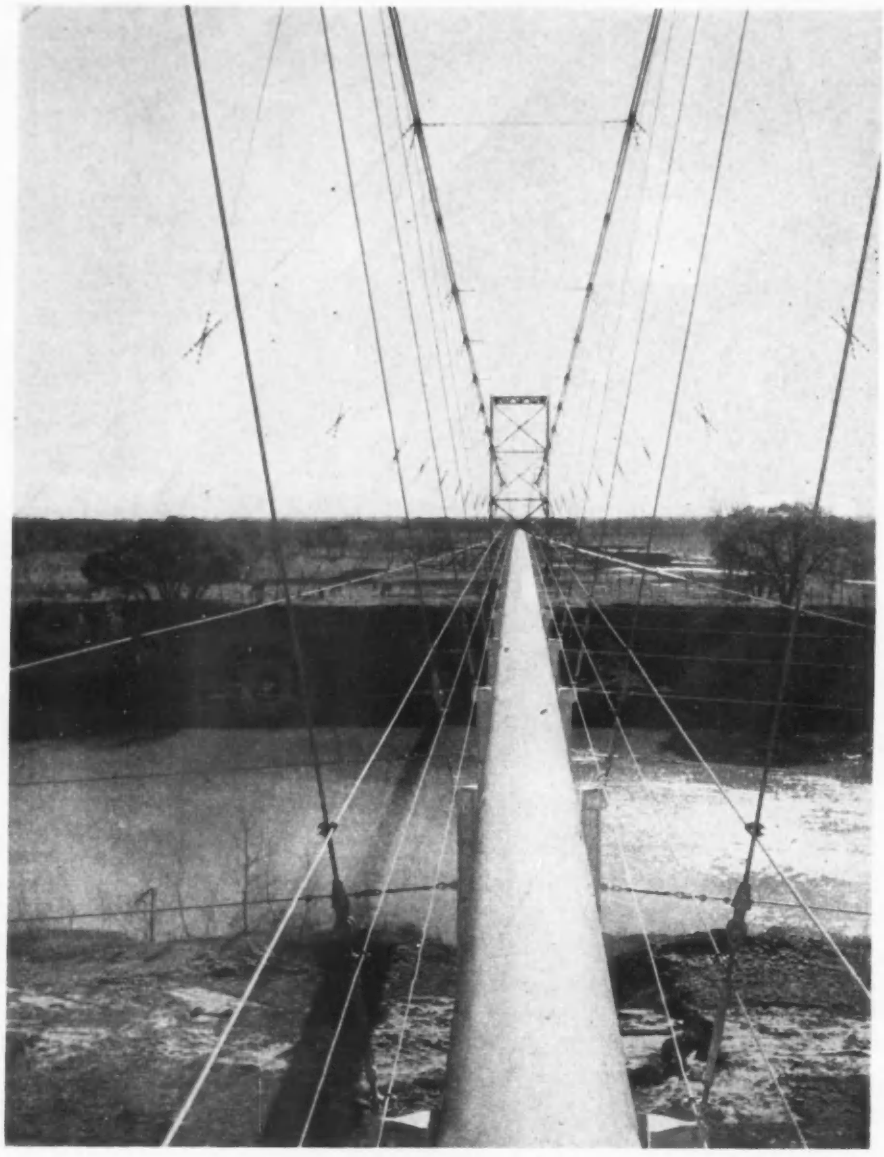


United Gas' Colorado River crossing in Texas.

United Gas System Serves 'The Gulf South'

THE PERIOD FROM 1913 to 1928 saw the organization of many oil and gas companies in Louisiana and Texas, and the gradual emergence of a few major groups, several of which have been moulded into the United Gas System. Among these were:

The Palmer properties which had extensive gas holdings in a number of Louisiana fields and included such companies as Louisiana Gas and Fuel, Atlas Oil, and others.

The Electric Power & Light properties, including the Industrial Gas Company, which served a new electric generating plant at Sterlington in the Monroe field of North Louisiana.

Magnolia Gas Company, which was formed by Magnolia Petroleum Company and built lines from Latex to Beaumont, and to the Dallas-Fort Worth area.

The Moody-Seagraves group, which constructed pipe lines between 1925 and 1928 from Corpus Christi to Houston, from Shreveport to Houston, from the Jennings field in Texas to Monterrey, Mexico, and from the Jennings field northward to San Antonio and Austin.

Northern Texas Utilities Company, which operated a transmission line leading from the Panhandle field to its distribution properties in Wichita Falls and to other communities of North Texas. (These properties were operated by United Gas for a number of years, but were never directly connected to the main system. They were sold in 1952.)

In 1930, with these five major groups as a nucleus, more than 40 associated companies were welded into United Gas Corporation. With this organization, United Gas in 1931, the first full year of its operations, served 300 towns and cities with a population of 2,310,000. The company operated approximately 8500 miles of transmission, distribution and field lines.

Immediately after its formation in 1930, United Gas Corporation began to reduce, as rapidly as feasible, the number of companies composing the group in order to simplify the corporate structure. By the end of 1937, the company became essentially the same as it is now, although there have been a few subsequent consolidations and changes.

From 1930 to 1940, the headquarters of United Gas were located at Houston. In 1940 the general offices were moved to Shreveport, La.

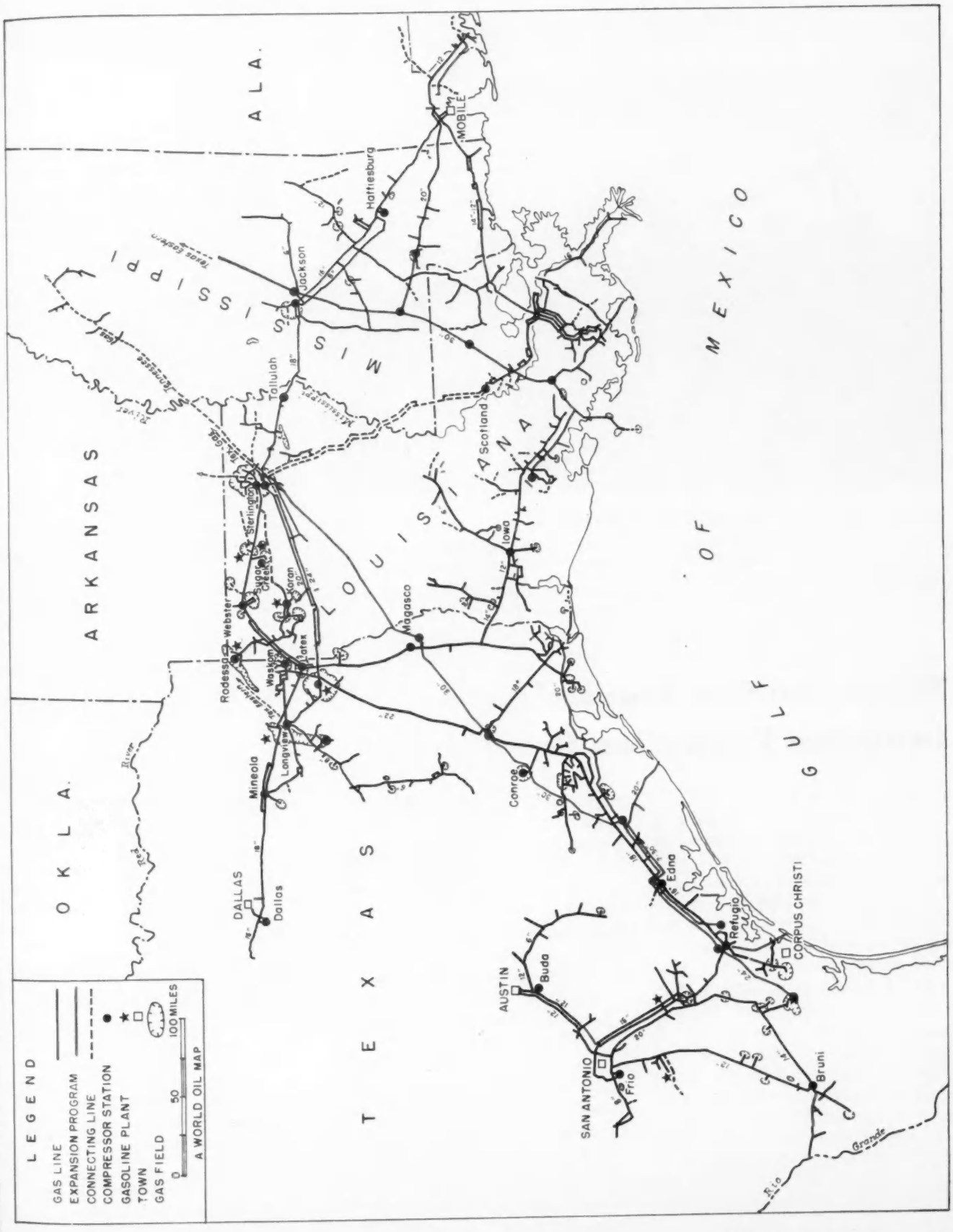
The history of United Gas Corporation has been one of steady growth and expansion. The company operates an integrated natural gas system.

The United Gas System serves major parts of Texas, Louisiana and Mississippi, extends to Mobile and other points in Southern Alabama, and to Pensacola in Northwestern Florida, and to the International Boundary at Laredo, Texas. This is the area which United Gas calls "The Gulf South." In addition to being engaged in all phases of the natural gas business, wholly owned subsidiaries of the corporation also are engaged in the production, gathering, and sale of crude oil; the recovery of natural gasoline and other liquid hydrocarbons through natural gasoline plants, cycling plants, and by condensation, and the sale of these products at wholesale.

No. 6 of a Series

UNITED GAS SYSTEM

Map of the Month



PIPE LINE *Construction*

By **THERESA K. MARTIN,** WORLD OIL Staff

Sinclair Oil Crude Line Nears Completion

Crude oil from the Sinclair Oil Company fields near Cushing, Okla., will flow the last 86 miles to refineries in Chicago through the 22-inch pipe shown in the foreground. The O. R. Burden Construction Company of Tulsa, Okla., is laying this last section of line stretching from Flanagan Station Tank Farm to Chicago. Burden has also completed the 180-mile section from Shelbina, Mo., to Forrest City, Ill., and the 280-mile section from East St. Louis to St. Joseph, Mo.

Tennessee Gas Transmission Launches Expansion Program

The Tennessee Gas Transmission Company's 1953 construction program includes laying approximately 369 miles of pipe line in Texas, Louisiana, Tennessee, Kentucky and Pennsylvania, enlarging two of its existing 25 compressor stations and completing construction of its twenty-sixth station.

The 369 miles of pipe line include 237 miles of loop line to be built parallel to sections of the existing system, and a new 132-mile line 26 inches in diameter to begin at the company's compressor station near Mercer, Pa., and extend northeast to the Hebron field in Potter County, Pa., where construction of storage facilities has been authorized by the Federal Power Commission. Completion of the work is anticipated by August 1.

Three sections of loop pipe line will be laid in Texas. A 43-mile, 26-inch line from near Edinburg to near Falfurrias, a 23-mile, 30-inch line from near Sinton to near Refugio, 28 miles of 30-inch from near Edna to about ten miles southeast of East Bernard are all under construction.

Louisiana work includes a 22-mile, 30-inch line to be laid parallel to the system from near Natchitoches to near Goldonna, and a new 6600-horsepower compressor station near Kinder.

In Tennessee, an 18-mile, 30-inch stretch of loop line will be laid from south of Bolivar to near Selmer, and a 47-mile, 30-inch line from a point about 20 miles north of Nashville to near Bowling Green.

Two lines will be built in Kentucky, a 35-mile, 30-inch line from near Campbellsville to near Danville, and a 21-mile, 26-inch line from near Carter to the Ohio River. Two 1320-hp compressor engines will be installed at the company's Station 214 near Carrollton, Ohio. A 132-mile, 24-inch line will be laid from near Mercer, Pa. to the Hebron field, Potter County, Pa., and two 1100-hp compressor engines will be installed at the company's station near Mercer.

Houston Contracting Gets Texas Pipe Line Contract

The Texas Pipe Line Company has awarded a contract to the Houston Contracting Company, Ltd., to construct 45 miles of crude oil lines and nine gathering pump stations in south Louisiana. Approximately 39 miles of 10¾-inch pipe line will be constructed between Erath station and Bayou Sale station.

The contract also provides for building 6½ miles of 8⅝-inch line from Bayou Sale station to Horseshoe Bayou and Bayou Sale oil fields. Provision also is made in the contract for short mileage of gathering lines to serve West Cote Blanche Bay field. Six gathering pump stations will be constructed on platforms set on piling over the water, and three gathering pump stations will be located on land.

Buckeye Pipe Line Company Contract to Williams Austin

Work was expected to start the first of this month on 100 miles of 10- and 14-inch products pipe line for the Buckeye Pipe Line Company. The 14-inch section runs from Binghampton to Auburn, New York. The 10-inch section runs from Auburn to Syracuse, New York. Williams Austin Company of Pittsburgh, Pa., will do the job.

W-K-M RENEWABLE SEATS for ECONOMY and EFFICIENCY

You save money with W-K-M Valves because in just a short time these seats can be replaced and the valve made as good as new, **while the valve is in the line.** Seats are protected in either open or closed position. Large seating area assures longer wear.

This feature and the well-known W-K-M design of Through Conduit Flow, with expanding gate and segment and positive Leverlock, have made W-K-M Valves outstanding throughout the world.

W-K-M COMPANY

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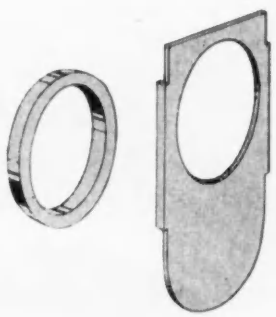
Export Office:
30 Rockefeller Plaza, New York, N. Y.

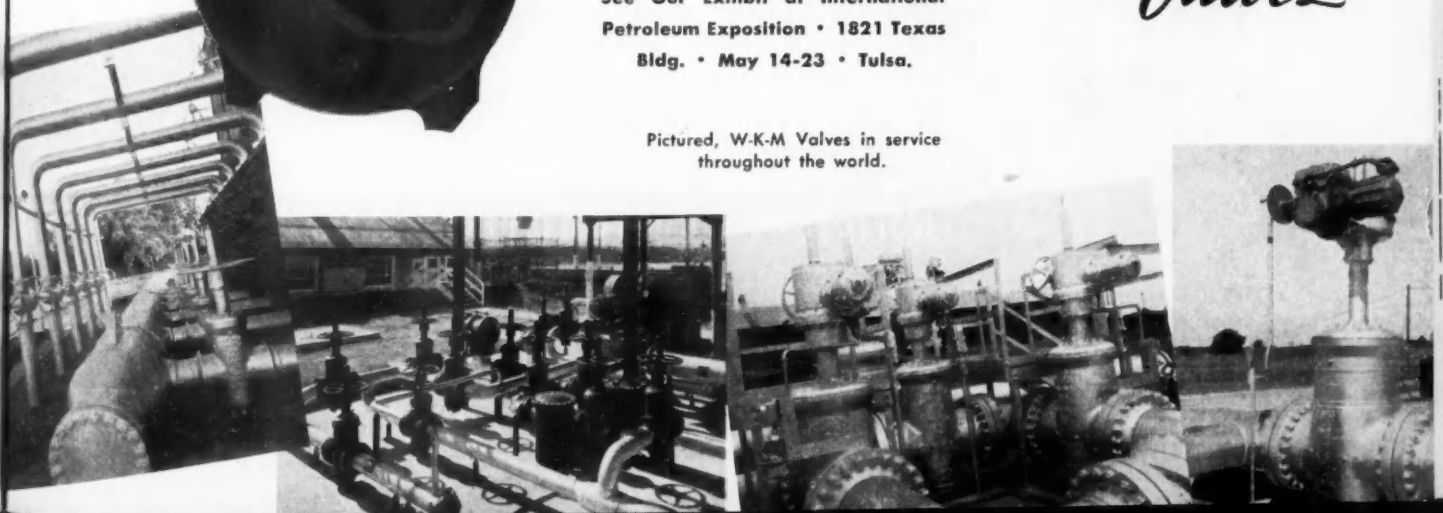
Shown here are W-K-M renewable seats with full-length skirts. Seats are made of various materials to suit any service.

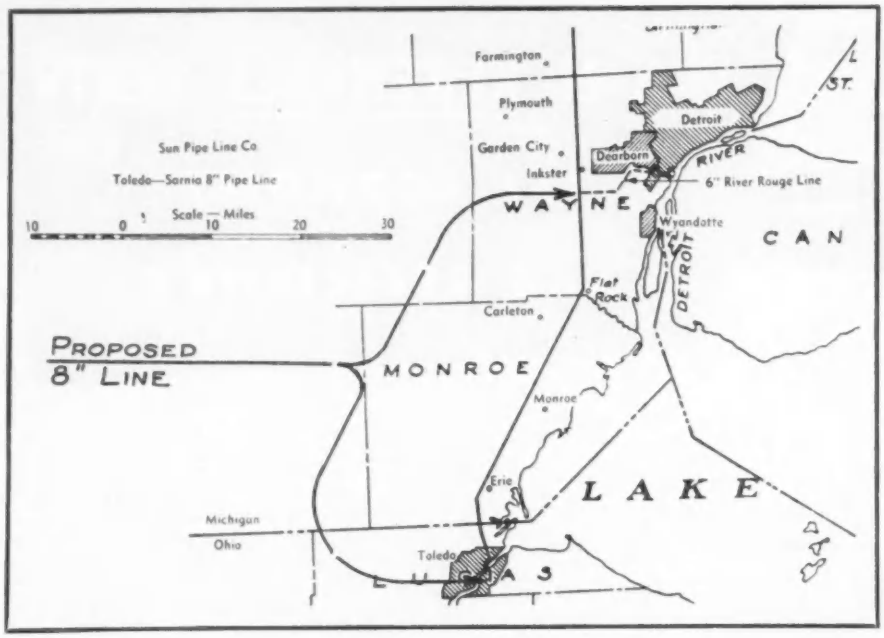


W-K-M Valves

See Our Exhibit at International Petroleum Exposition • 1821 Texas Bldg. • May 14-23 • Tulsa.

Pictured, W-K-M Valves in service throughout the world.





Sun Pipe Line Company Announces Toledo Line

Construction is expected to start in mid-May with completion scheduled for October 1 on Sun Pipe Line Company's 45-mile, eight-inch products pipe line loop between Toledo, Ohio, and Inkster Junction, west of Detroit, Mich. The new line will generally parallel an existing company products line extending from Toledo to Sarnia and will handle delivery of products from the Toledo Refinery to Sun's marketing terminal at River Rouge, Mich.

It will have a capacity of 20,000 barrels daily.

Texas Gas Reports New Highs In Capacity and Deliveries

Texas Gas Transmission Corporation's 1952 annual report shows gas reserves available at the year end were 11 percent greater than at the end of 1951. At year end, estimated reserves available to the Texas Gas System were more than 4.75 trillion cubic feet.

Daily delivery capacity increased from 845 to 1066 million cubic feet per day due to completion of most of the company's expansion program by December, 1952. Construction of 363 miles of 26-inch line, additional horsepower at six existing compressor stations, and two new ones were completed before the end of the year. The remaining portion of the expansion program, 45 miles of line in Kentucky, will be completed by the middle of 1953.

Gas sales were up from 218 billion cubic feet a year to 240 billion cubic feet. Average daily sales were 655 Mmcf a day in 1952, compared with 597 million a day the preceding year.

For Long and Loyal

HOUSTON CONTRACTING CO.

SERVICE...

One hundred forty-six members of our organization have been awarded these pins in recognition of their service to us and our customers. Together they have over 1238 years of experience in every phase of pipe line construction. It's pipe line career men like these that build your lines when Houston Contracting is on the job.

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Rules of Thumb

FOR THE PIPELINER'S NOTEBOOK

These formulae from the pages of engineers' own notebooks yield rough, but reasonably accurate answers for design, maintenance and supply questions. Use them for quick calculations to solve your everyday pipe line engineering problems. If you have a pet Rule of Thumb, share it with others by sending it to Donald M. Taylor, Pipe Line Editor, WORLD OIL, P. O. Box 2608, Houston 1. During the past month, the editor has received several Rules right off the top shelf. They will appear in early editions of WORLD OIL. The rules are being numbered according to subjects to aid classification when published in book form and to help you, the reader, file them in your notebook.

Pipe Line Construction —4—How to identify the schedule number of pipe by direct measurement.

Add three inches to the actual inside diameter; divide this by the wall thickness; the schedule number can then be identified by the following table:

Schedule 30	40 to 50
Schedule 40	29 to 39
Schedule 60	25 to 29
Schedule 80	20 to 23
Schedule 100	16 to 18
Schedule 120	13 to 15
Schedule 140	11 to 13
Schedule 160	9 to 11

Example: Pipe measures 12.5 inches inside diameter, wall thickness .75 inch; 15.5/.75 = 20.2; pipe is Schedule 80, 14 inches outside diameter.

The rule fails on small diameter pipe (under 6 inches), and also on schedules 10 and 20, because of the use of "standard" thicknesses in this range.

Miscellaneous —5—Volume of liquid in vertical cylindrical tanks.

Measure the depth of the liquid and either the diameter or circumference of the tank; then the volume in

Gallons = $0.0034\ d^2h$ or $0.00034\ c^2h$
Barrels = $0.000081\ d^2h$ or $0.00082\ c^2h$
Gallons = $5.88\ D^2H$ or $0.595\ C^2H$
Barrels = $0.140\ D^2H$ or $0.0142\ C^2H$

Where d = diameter in inches D = diameter in feet
c = circumference in inches C = circumference in feet
h = depth in inches H = depth in feet

If the circumference is measured on the outside, then three times the thickness of the tank wall should be subtracted before using the formula. Naturally, these rules cannot supplant the results of accurate tank strapping, which take many other factors into account.

Example: How many gallons will a tank 12 feet in diameter and 16 feet high hold when full?

Gallons = $5.88\ D^2H$
= (5.88) (144) (16)
= 13,548 gallons

Example: How many barrels will a tank 8 feet in diameter and 16 feet high hold when full?

Barrels = $0.140\ D^2H$
= (0.140) (64) (16)
= 143 barrels

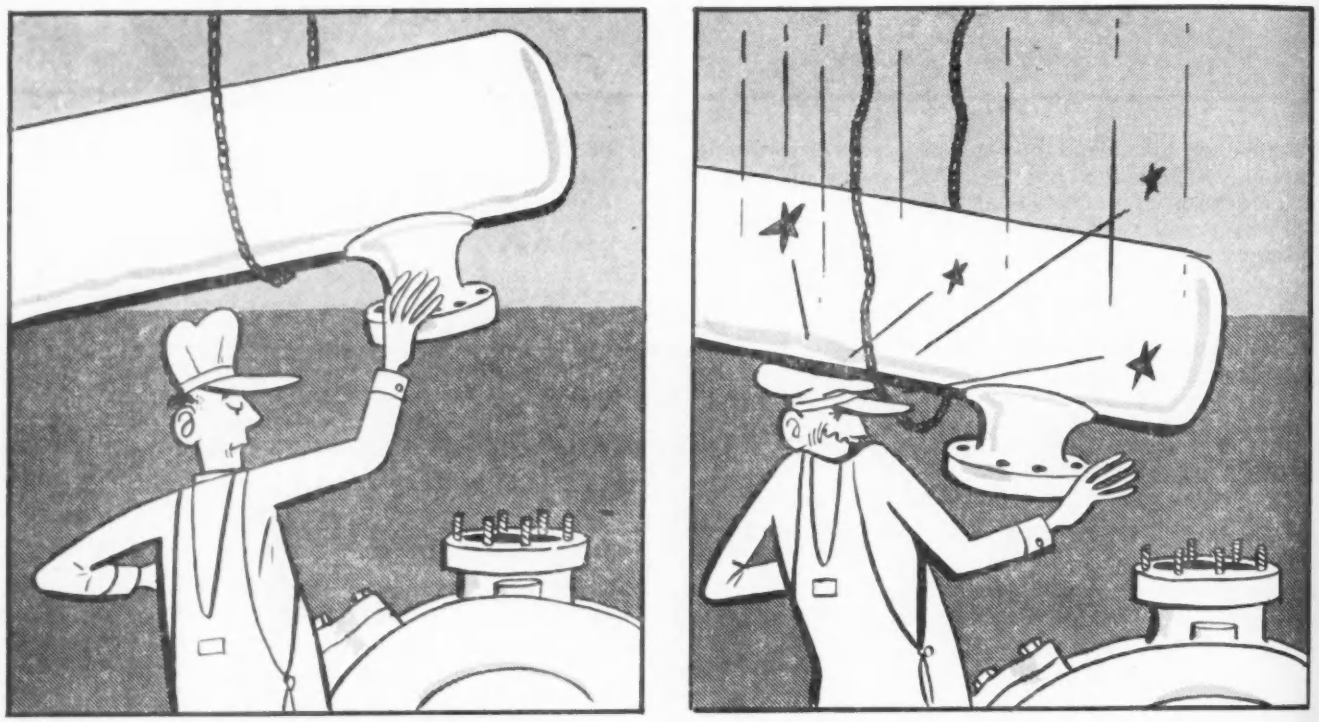
Corrosion Protection —6—What will be the resistance to earth of a single graphite anode?

For the most common size, 3 inches by 60 inches, installed in ten feet of coke breeze backfill in an 8 inch hole, multiply the soil resistivity in ohm-cm by 0.002; this will give the resistance to earth in ohms.

Example: 1800 ohm-cm soil; $1800 \times 0.002 = 3.6$ ohms.

This assumes that the resistivity is uniform to considerable depth; if it increases with depth, the resistance will be slightly higher.

Perils of Pipeline Pete



And now we'll never find . . . . just what Pete had on his mind

Explosives left lying around . . . . can cause a disconcerting sound

Oil Painting by Tom Hill especially for Barrett Division

Hot stuff...for rough duty!

To assure pipe preservation, protective coal-tar enamels must be applied while hot. Two factors are all important if pipelines are to survive tough climates and rough conditions. One is the *right* protective coating. The other — proper application. When you specify Barrett — you can get *both!*

Barrett not only offers the finest protective coatings, but also the services of a Barrett Technical Advisor. He will help you to determine the *exact* coating to meet specific needs and requirements and still keep cost to a minimum.

In the field, where pipe preparation and coating application are of vital importance, a Barrett field inspector is available to advise and render aid learned from years of pipeline experience. Barrett inspectors are available whenever needed. It is for this purpose that Barrett maintains field offices strategically located throughout the country.

Write, phone or wire for further information and a free copy of Barrett's Field Manual. It's a valuable book concerned with detailed application procedures. Send for it today.

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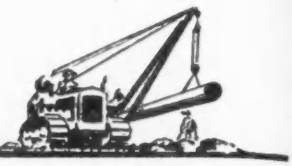
How to do it! PIPE LINE HINTS



$10 is paid for each illustrated acceptable contribution. Mail to The Editor, WORLD OIL, P. O. Box 2608, Houston 1, Texas

Racking Drums Aids Handling

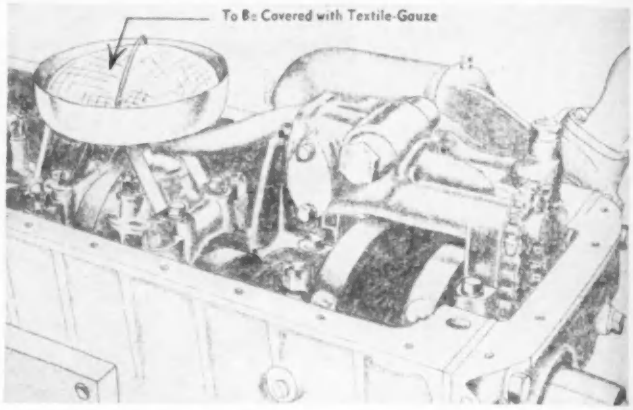
Make handling drums of chemicals an easy job by racking them on old big-inch pipe dollies. These dollies, of which there usually are plenty left from pipe line construction, can be supported by almost any kind of frame built from wood, scrap pipe or angle iron. If the frame is built of wood, bolt the dollies to it; if metal is used, weld the dollies in place.

Regardless of how the rack is constructed, it will give good service in handling drummed chemicals, especially those which tend to settle out and require some agitation before they can be used.

In making this rack, one plant used 2-inch angle iron, building a frame the exact dimensions of the drums to be used and using the same size angle iron for supports. At this stage the rack resembles an iron table with no top. Two 30-inch pipe dollies left from construction work can be mounted on each end of the table for the drum to rest upon. The relationship of the pipe dollies to each other forms a V into which the drum can fit. The wheels on the dollies allow one person to move the drum to any position that the bung may be reached, making a neater installation of an otherwise unsightly operating routine. For caustics, the safety factor outweighs the small fabrication cost for a rack of this type.

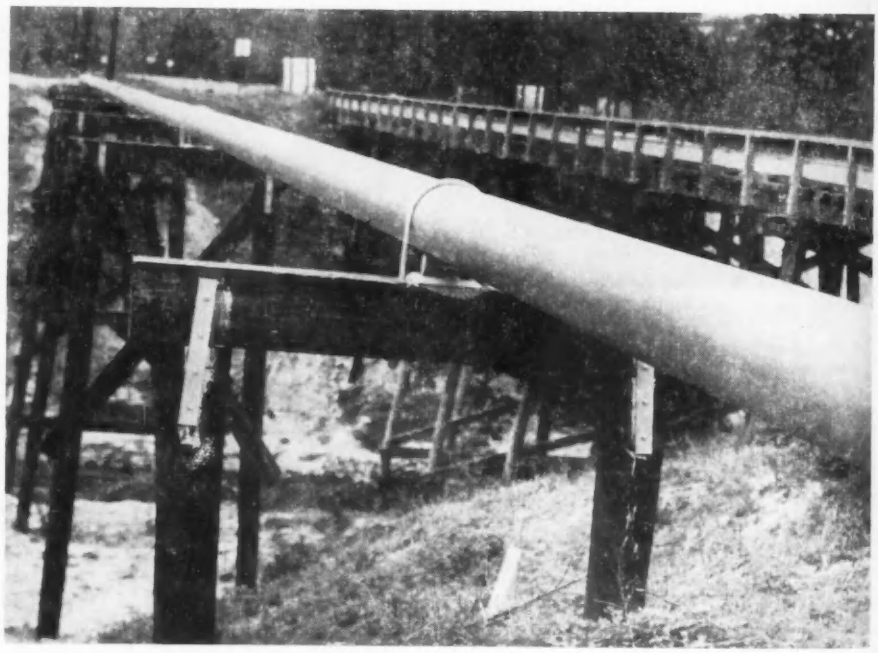
Textile Gauze Aids Engine Break-In

Cover the oil strainer on a diesel engine with two layers of textile gauze during the breaking-in period after a major overhaul and remove impurities from the lubricating oil.



Every time an engine unit is dismantled for a major repair and reassembled, dirt, grit and other detrimental material will find their way into the oil. One solution to this problem is to run the engine for about ten hours using a light oil and gauze over the oil strainer. Then remove the oil pan and take the gauze off the strainer. Much abrasive material will be found trapped in the gauze, along with lint and undefinable materials that even the most careful mechanic cannot keep out of the engine.

This act will shorten the breaking-in period for the engine and possibly lessen future engine trouble.

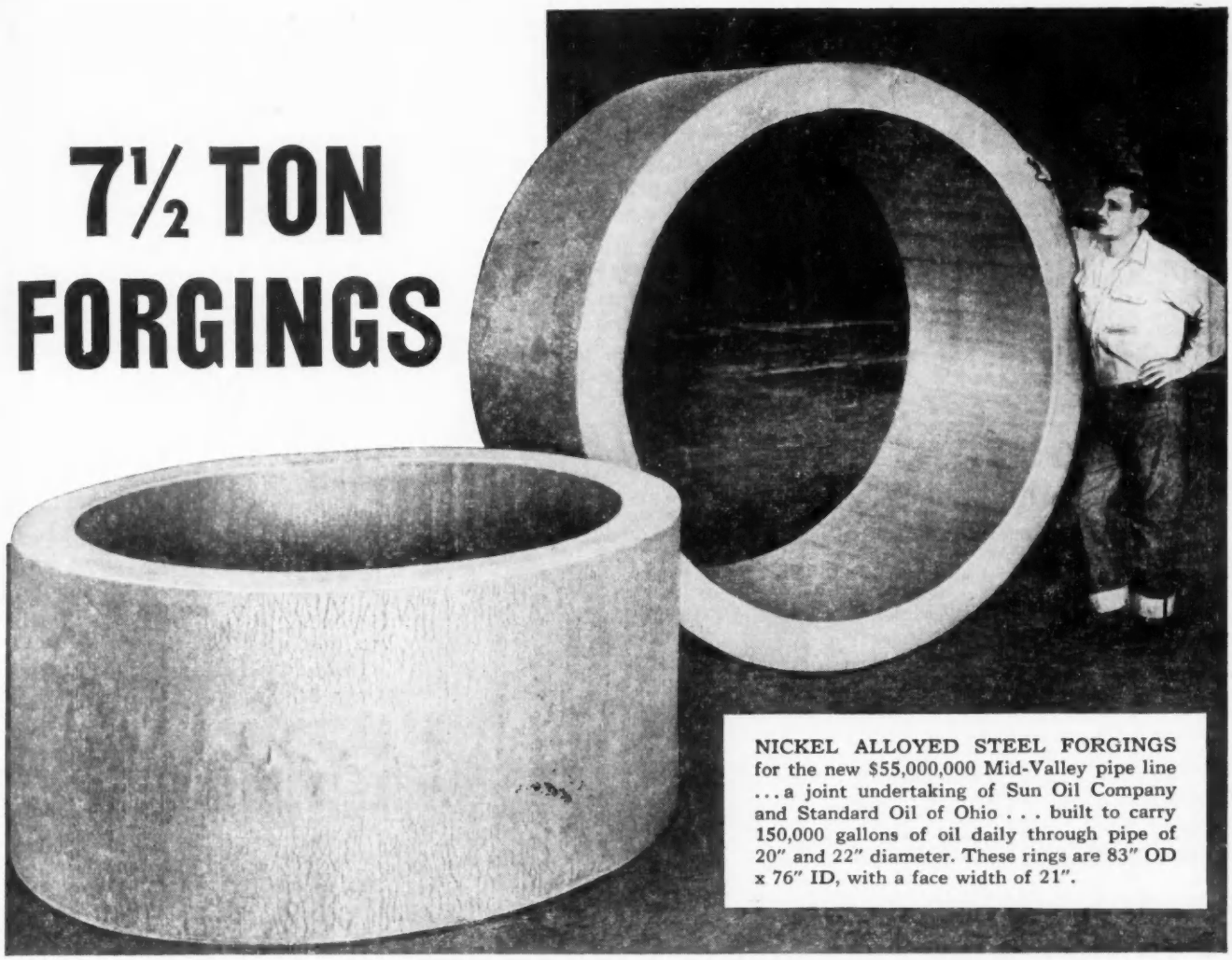


Rollers Relieve Stress on Bents

An inexpensive pipe line aerial crossing can be made by driving simple pile bents and clamping the pipe to the cross member. A roller beneath the pipe lets the pipe move as it contracts or expands with temperature changes. This keeps the thermal stresses off the bents themselves.

In the accompanying photo, the

7½ TON FORGINGS



NICKEL ALLOYED STEEL FORGINGS for the new $55,000,000 Mid-Valley pipe line ... a joint undertaking of Sun Oil Company and Standard Oil of Ohio . . . built to carry 150,000 gallons of oil daily through pipe of 20" and 22" diameter. These rings are 83" OD x 76" ID, with a face width of 21".

How Nickel Alloyed Steel Strengthens Gears that Power a Pipe Line

These giant ring gear blanks weigh 7½ tons each...

This pair is from a batch being forged, heat-treated and rough-machined at The National Supply Company's plant in Torrance, California.

After teeth are cut and finished, all will serve in pumping stations along the new 100-mile Mid-Valley pipe line.

These nickel alloyed steel forgings will form the outer rims of bull gears in eight 1700-horsepower speed-increaser units... the largest ever built for pipe lines in this country.

National Supply engineers specify Type 4340 nickel-chromium-molybdenum steel for these ring gears, to assure ample strength, toughness and wear resistance. Excellent depth hardening properties make Type 4340 particularly desirable for heavy duty forgings. Moreover, outstanding fatigue strength characterizes this nickel alloyed steel.

INCO booths Number 64 & 65

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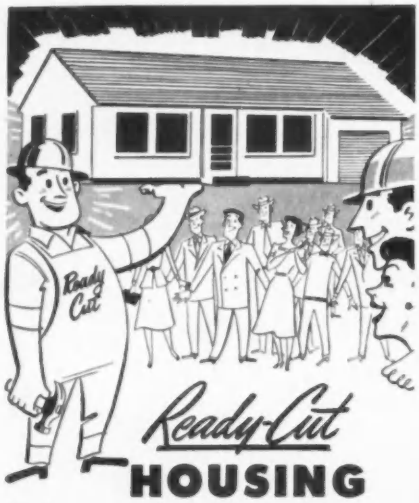

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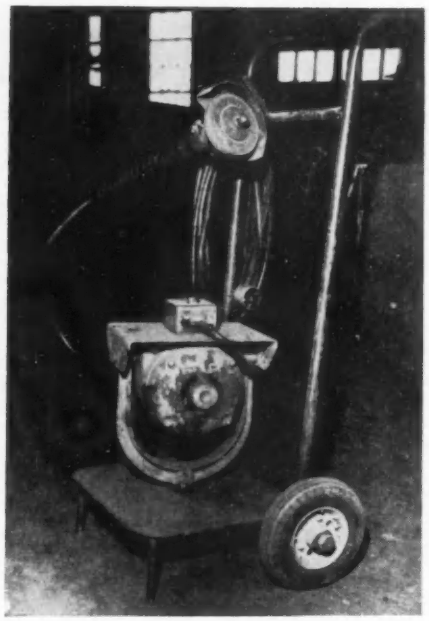
pipe line is a 12-inch bayou crossing suspended by piling bents spaced every 20 feet. The pipe is clamped to the rough timber cross-piece with seven-eighths-inch steel rod, bent to the contour of the pipe and threaded at each end. Beneath the pipe is a bearing plate which supports the roller that carries the weight of the pipe and transfers the load to the supporting structure. As the pipe moves forward or backward, the roller turns on the bearing plate.

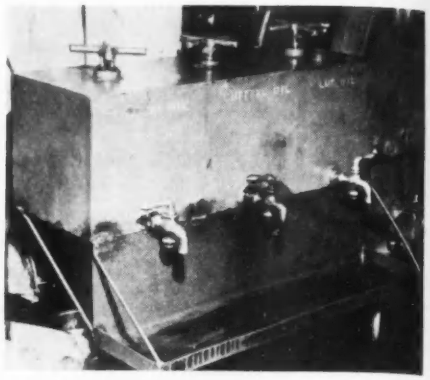


Grinder on Wheels Is Easy to Move

This electric grinder is easy to transport wherever it is needed because it is mounted on ball-bearing wheels. The device can be constructed by modifying a light warehouse truck or building a truck from scrap pipe and plate. Weld a frame work of 1¼-inch pipe to the axle of a pair of ball bearing wheels. On one side of the handles of the cart, weld two lugs so the electric cord can be coiled when the machine is not in use.

Make the base that supports the grinder motor from three-eighths-inch steel plate. Weld short pieces of ½-inch rod on the bottom so the cart will stand upright. Then drill the base and bolt on the motor yoke.

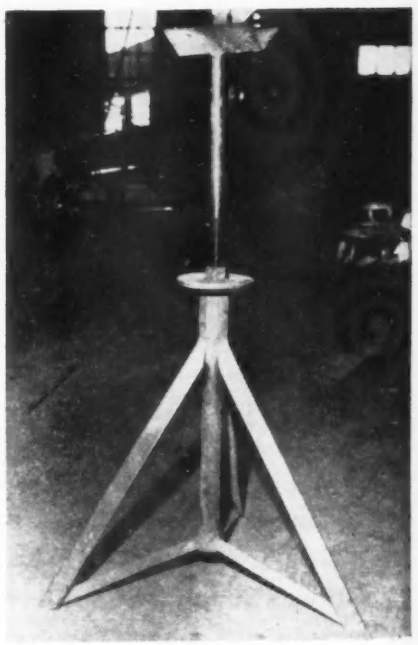
Provide a hookup on the handle for the grinding rock. Caution should be taken to make sure the extension cord is the kind that has a third ground wire which can be grounded up at the plug. This will eliminate the danger from a short in the motor.



Dispenser Keeps Oil Free of Dust

The illustrated oil dispenser not only does away with a clutter of oil cans but it keeps the oil free from dust and other matter found around a machine shop. This three-faucet model was made to hold three grades of oil but could be expanded to hold any number.

Over-all dimensions of the tank are 8 feet by 8 feet by 20 feet. Made of 14-gauge steel, the tank is constructed by first welding together the sides and bottom and then welding the partitions into place. The tray for holding cans and catching drippings is of 14-gauge steel also. The oil flows through ½-inch brass spigots. This model is welded to a steel post behind the dispenser. Another method of mounting is by using steel hooks welded to the back side of the tank.



Adjustable Tripod Holds Pipe Steady

To facilitate working on a piece of pipe while it rests on a table or stand,

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an adjustable tripod can be made to hold up the other end of the pipe and to keep it steady.

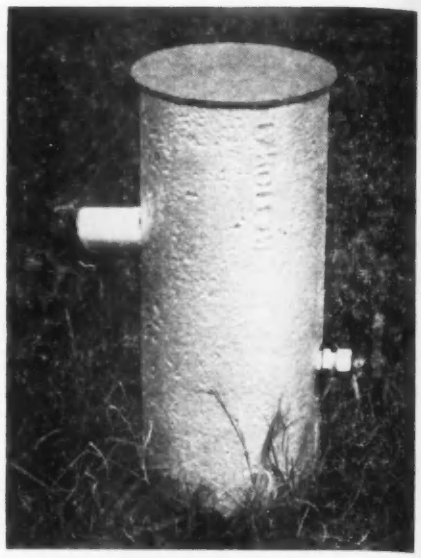
Make three legs of 1¼-inch angle iron and brace them with braces of one-inch angle iron. Use a one-inch standard thread screw to fit into a 1¼-inch pipe guide. The screw can be raised or lowered by the wheel which is a gate valve with an inch nut welded in its center. The V at the top on which the pipe rests can be made from a short section of angle iron.

Hydrant Effective In Warm Climates

A field fabricated fire hydrant can save money, and in warm climates, be as effective as more expensive cast iron hydrants.

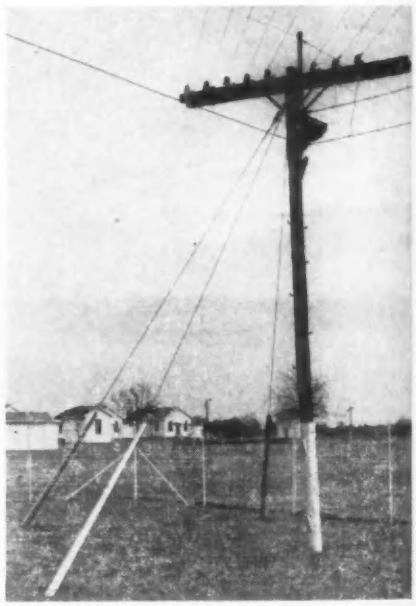
Ordinarily the factory made hydrants drain into a small gravel bed when not in use. This protects the hydrant from freezing up.

One company accomplished almost the same thing by running the hydrant inside an eight-inch riser, filled



with insulating material. This will protect the line from freezing in the relatively mild winters of the South.

Where the fire line ells out, it is capped so the threads will be protected and dirt will not accumulate inside the valve.



Guy Wire Shields Are Safety Measure

A small thing—but a serious safety hazard—is the guy wire in the plant yard. Even though the pole it braces, is remote and traffic around it light, it can cause serious injuries—both during the day and at night.

To minimize the danger, apply guy wire shields to each wire in the plant and paint them a bright color which can be seen easily at night.

As a further safety precaution, paint the bottom section of the pole, as well.

Standard Oil Company (N. J.) Photo

This is the modern village for employes of International Petroleum Company at Talara. A few years ago the area was a sandy waterland. Below is another view of the housing units.

This Is Talara

Oil has awakened a sleeping fishing village. Peru's leading oil town is a far cry from the days of the Conquistadores.

IT'S more than just coincidence that Talara, Peru's leading oil town, is also the nation's most modern and fastest growing city. Situated on the north Pacific coast in the desert region, where nearly all of Peru's oil industry is found, Talara has been undergoing a complete transformation in the post war period.

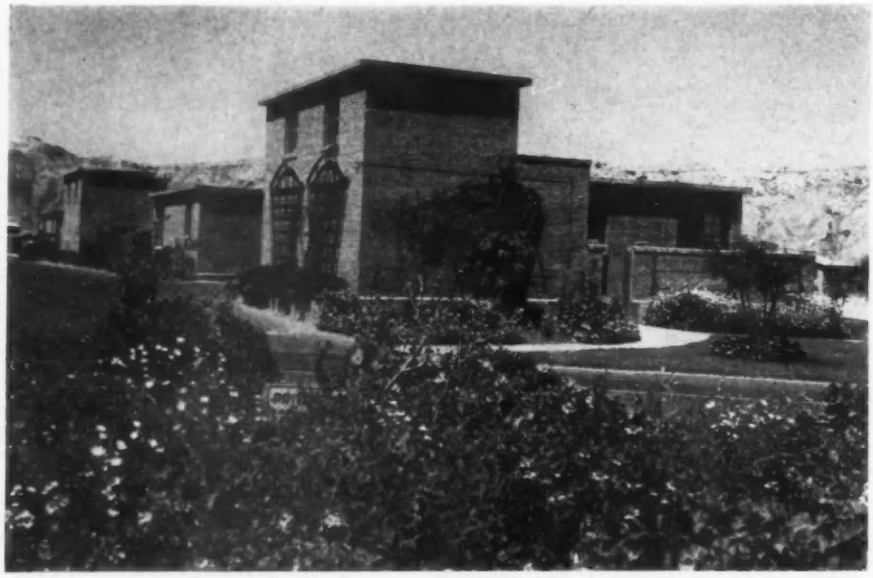
Talara is the operations center of International Petroleum Company, a Standard Oil Company (N. J.) subsidiary, which has been developing oil production in the area for almost 40 years. Over the years, Talara has grown from a sleepy fishing village to a bustling community of 24,000 inhabitants, with a population of about the same size living in the adjacent oil field area. It has become the second seaport of importance in Peru.

Seven years ago, International Petroleum decided to build a complete new industrial city at Talara from the ground up for its 4500 employes in the area. The old housing structures which have sheltered the staff and workmen for two or more generations are gradually being razed. Since less than 5 percent of International's employes are non-Peruvians, the new Talara now nearing completion is not a city transplanted from North America and inhabited largely by foreigners.

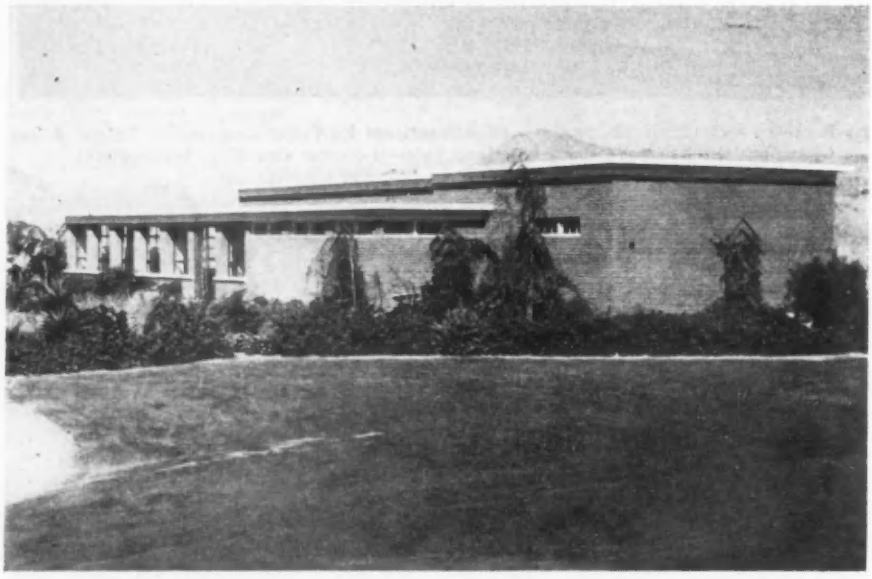
Modern City. It is a well-planned city of modern brick homes set in a picturesque framework of parks and avenues. Every facility for comfortable living is provided. The staff residential area is situated on the seafront in the sector known as Punta Arenas. The houses have two and three bedrooms and are completely furnished. Rent is free and the occupants pay only a nominal charge for utilities. Special bachelor quarters are provided and meals are served in a spacious dining room overlooking a swimming pool and gardens at the employe's club.

Despite its location five degrees south of the equator, Talara's semi-tropical climate is refreshed continuously by sea breezes. Like many spirited cities, the new Talara has its mind to become known as a "garden city," and to spur on the efforts of

This feature, one of a series describing important oil camps or cities throughout the world, is intended only to describe living conditions and to give a bit of the local atmosphere. While an occasional one of the features may touch lightly on working conditions, it will do so only incidentally.



Homes . . . a close-up view of living quarters.



Schools . . . IPC operates 13 in Talara area.

Churches . . . the first building completed.

the individual citizens, International holds an annual floral contest, awarding prizes for the best gardens.

This is an achievement of note when it is realized that the area is a desert region. International Petroleum had to overcome the natural difficulties of a steeply sloping terrain, dryness and its isolation from other parts of Peru to develop a community and city. Water, to make those attractive gardens possible, is piped from the Chira River, some 25 miles from Talara. The company also has to provide electricity for the entire community.

The transition of Talara into a modern city is apparent to anyone approaching the city down the bluff towards the harbor. To one side is the old town which will eventually disappear; to the other new buildings have rapidly grown in the modernization move. A new modern church has been completed in the Civic Center and nearby is a modern polyclinic, recently completed at a cost of $200,000, where hundreds of consultations are handled daily.

A new market area has been constructed occupying about 72,000 square feet and containing 300 stalls, two dozen small shops and two public restaurants. Private enterprise shops, motion picture theatres and banks, gradually moving from the older section of town, are nearby the market center.

Social Activity. While for the most part the company is required to make numerous provisions for its employes' comfort, life in Talara is far from being a "company town" of isolated existence. Except for the fact that the community is bilingual, everyday living is much the same as it would be in any modern city of comparative size. Social activity centers to a great extent at the employes club, but the increasing number of Peruvians in top staff positions with International Petroleum has stimulated close personal relations between foreign company employes and other citizens of the city—some associated with and some not associated with International Petroleum.

Children of International Petroleum employes have the advantage of a dual educational system. Parallel classes are provided, one system in accordance with the U. S. educational system for foreign employe's children and the other in accordance with the requirements of the Peruvian Ministry of Education for the children of national employees. In addition to the Peruvian schools, International Petroleum operates 13 schools in the Talara area, paying teachers' salaries (they are not company employes), maintenance and operating expenses.

In addition to the polyclinic, International Petroleum also operates a hospital with 106 beds and has a medical department of 13 doctors and more than 100 nurses and assistants.

Leisure time activities are numerous at Talara. At the employes club, sports, dances and other activities are available. There is a nine-hole golf course laid out on a desert terrain. Nearby beaches are attractive and seaside excursions during the December-April summer are a favorite pastime.

For fishing enthusiasts, the location of Talara is ideal, as offshore waters are rich in marine life and are considered among the finest fishing grounds in the world for swordfish.

Sights to See. For the sightseers and motoring fans there are attractive week-end trips in several directions. Northward, the Ecuadorian frontier offers a typically tropical climate and vegetation. Piura, an important commercial center in Northern Peru, can be reached in two hours. Lima, the beautiful capital of Peru, can be reached in four hours by plane. Nearby Talara, of historical significance is the location of the tar pits of La Brea, where the Spanish Conquistadors founded the first Peruvian petroleum industry, using the heavy pitch for caulking their boats.

The modern city, an agreeable climate, favorable working conditions and the friendly community spirit offered by the Peruvians, famous for their hospitality, make Talara an attractive locality for oil industry employes.

Hospital . . . a clinic for employes' use.

Recreation . . . swimming pool at employes' club.

Sports . . . the new stadium at Talara.

Of World Oil Men

They'll Head Los Angeles Nomads in 1953

New officers of the Los Angeles Chapter of Nomads are, left to right, Bill Wilson of Web Wilson Oil Tools, Inc., junior regent; Jerry Engstrand of Grant Oil Tool Co., senior regent; Joe Schlarb of Chiksan Company, sergeant-at-arms; Jim Hughes of Lane-Wells Company, president; John Flanagan of Johnston Testers, Inc., vice president; Bill Sargent of Sargent Engineering Corp., secretary; Bob Craig of National Supply Co., treasurer; Wally Sawdon of Technical Information Service, executive secretary. Not shown in the picture are Vern Mitchell of Security Engineering Div., assistant secretary; Leo Cypher of Baash Ross Tool Co., assistant treasurer; Ox Morgan of Oil Well Mfg. Company, deputy sergeant-at-arms.

WALTON H. HOHAG, JR., has been elected director, vice president and general manager of Banff Oil Ltd. operations in Western Canada. Formerly a director and vice president of Socony Vacuum Exploration Company and manager of exploration for that company for several years, Hohag has had extensive exploration experience in Canada, the U. S. and Saudi Arabia.

W. H. Hohag, Jr.

•

WILLIAM W. CLAWSON, of Billings, Mont., has been named president of Socony-Vacuum Exploration Company, an affiliate of Socony-Vacuum Oil Company, Inc. H. R. MOORMAN of Calgary, is executive vice president; and WALTON H. HOHAG and L. C. STEVENS, both of Calgary, are vice presidents. These four men also constitute the board of directors.

Other officers are: secretary, HARRIS E. McCOMBS, Calgary; assistant secretary, W. A. WORK, Calgary; comptroller and treasurer, J. C. THOMPSON, Billings; assistant comptroller, B. E. TAYLOR, Calgary; and assistant treasurer, M. P. ROLLICK, Calgary.

•

G. H. HERRIDGE, who was recently named executive director to Iraq Petroleum Company and affiliates, has been associated with the company in its Middle East oil operations since 1926. For the past year he has been in the London headquarters office as head of the concessions and administrative divisions. Previous to that, Herridge had been general manager in the Middle East since 1947.

•

MARSHALL W. TAYLOR II, formerly of San Antonio, Texas, has joined The British American Oil Company Limited as divisional petroleum engineer in Calgary, Alberta, Canada.

CHARLES E. RIDDELL has been appointed exploration manager for The British-American Oil Producing Company's northwestern division, with headquarters at Denver, Colorado.

Charles E. Riddell

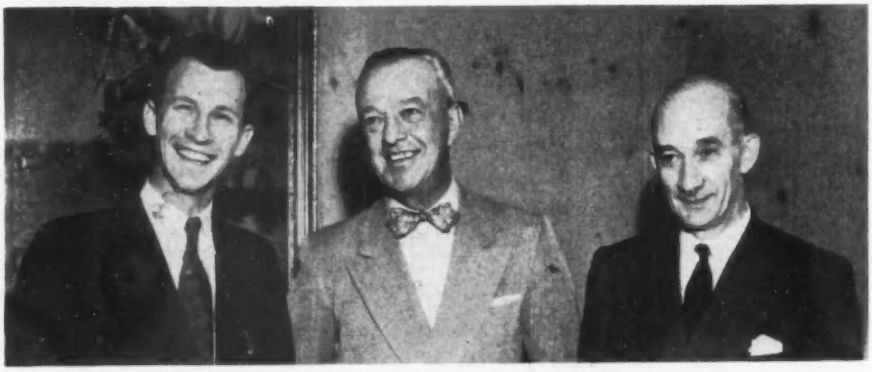
Riddell was born at Seattle, Washington. He received a B.A. degree in geology from Stanford University in 1937, and during that year joined United Geophysical Company as a rodman, progressing to surveyor, computer, party chief, and area superintendent.

In 1946, he was transferred to the Middle East as area superintendent for India, Iraq, Iran, and Turkey. Three years later, he went to South America, where he operated in Chile and Brazil.

Riddell returned to the U. S. in 1952 and joined Union Oil Company as Rocky Mountain area division geophysicist, with offices at Denver, where he remained until his appointment by British-American.

•

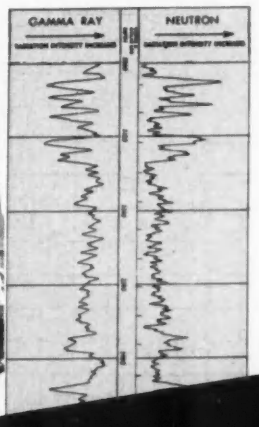
WALKER L. TAYLOR, assistant general manager of exploration and producing operations for Imperial Oil Limited throughout Canada since 1949, has retired. Taylor joined the company in 1919, spending his early years with the company in Canada's Turner Valley in charge of wildcat drilling operations. After serving in Peru for five years, Taylor went to Norman Wells to supervise development and exploratory operations and later became manager of western producing.



Guests of Houston Nomads

A tiger hunt travelogue by a famous big game hunter, Jack Roach, Sr., of Houston, was featured at a recent meeting of the Houston chapter of Nomads. Left to right above are: Don Rushton of Canadian Equipment Supply Company, Edmonton, left; Roach, center, and J. M. Leitch, London manager of Continental Supply Company.

Gamma Ray & Neutron Curves on ONE trip in the hole



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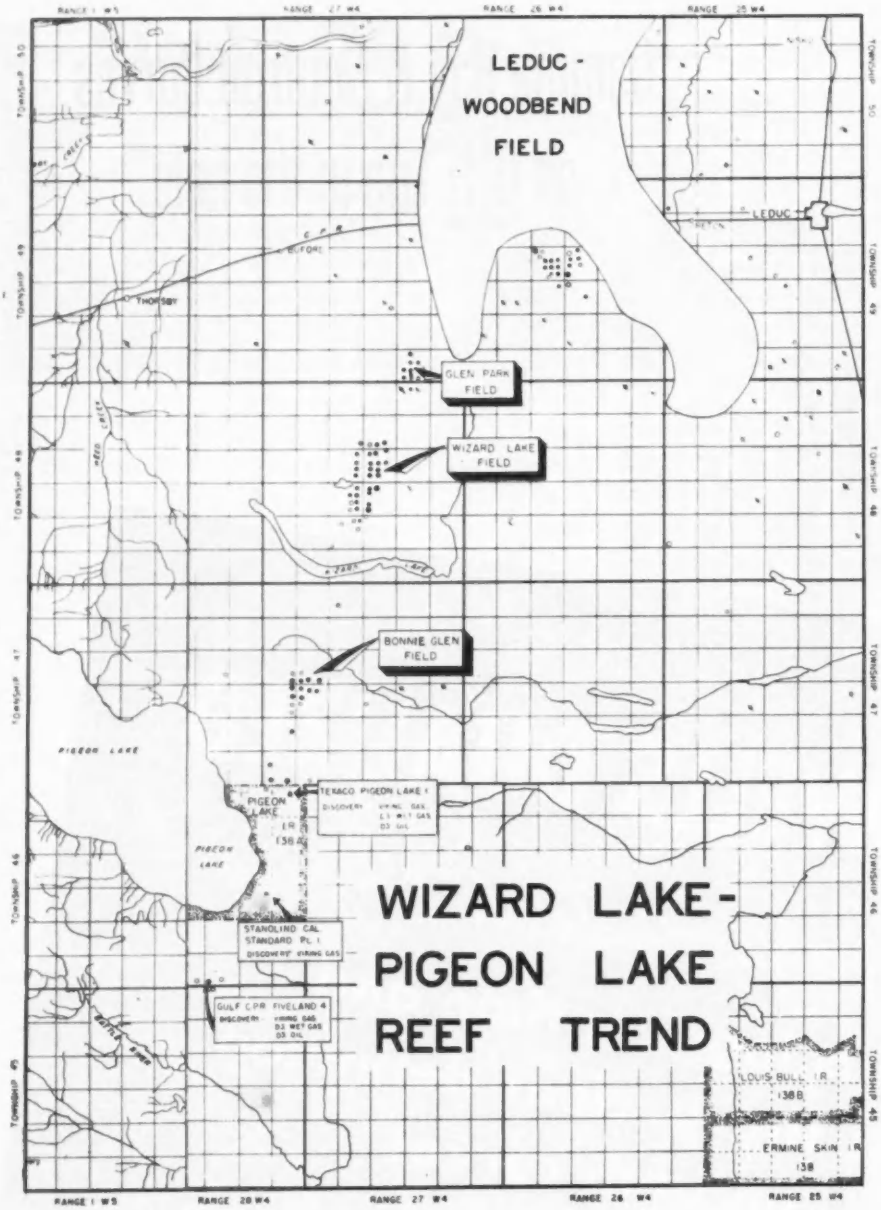


Canadian D3 Play Is Developing Fast

Wizard Lake, an important 1951 discovery, has combined with three new Devonian Reef discoveries —Bonnie Glen, Pigeon Lake and Fiveland—to turn region southwest of Leduc into 'hot' oil area.

By GILBERT M. WILSON
WORLD OIL Staff

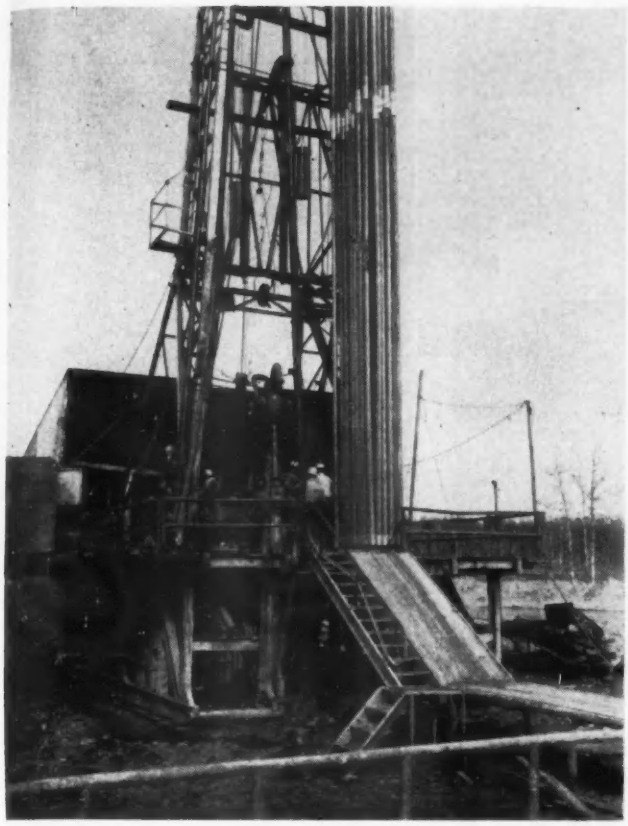
Wizard Lake, an important 1951 discovery, combined with three 1952 Devonian Reef discoveries, Bonnie Glen, Pigeon Lake and Fiveland, has turned the general region southwest of Leduc into one of the "hottest" oil areas in Alberta. Northernmost of the reef fields in this trend is the Glen Park pool about 35 miles southwest of Edmonton and two miles southwest of the southern tip of the large Leduc-Woodbend oil field.

The Glen Park reef field, discovered by The British American Oil Company Limited in 1951, had a D3 pay thickness ranging up to 422 feet, with 35 feet of gas cap and 35 feet of oil pay in the Devonian D2.

Two miles southwest of Glen Park is the Wizard Lake field, a prolific D3 producer with a recorded maximum oil pay thickness, in one of the wells, of 629 feet. This field, at the present time, has a productive area exceeding 1000 acres, with limits yet to be defined. This field, together with Glen Park, it is estimated, likely will provide a minimum of 200 million barrels of oil and probably more, when limits of the fields are finally evaluated.

Some five miles southwest of Wizard Lake, and regarded as probably the most prolific oil strike made in Alberta in 1952, is the Bonnie Glen field which, in mid-October, indicated prospects of becoming a major oil field as successful extension wells definitely established the link with the Pigeon Lake discovery two and one-half miles still further to the south. The Bonnie Glen strike was made in January of 1951. In view of the apparent connection between Bonnie Glen and Pigeon Lake, considerable area remains to be drilled up and, with outside limits of the two fields as yet undetermined, it seems likely that this will remain an active area for some time. Thickest oil pay so far indicated in the Bonnie Glen sector is 650 feet of D3 reef, with about 300 feet of it being oil zone and the remainder wet gas pay.

The Pigeon Lake field, discovered in July, proved up a thick Devonian D3 pay zone exceeding 630 feet, made up of about 287 feet of oil zone and the remainder wet gas pay. With subsequent drilling proving that Pigeon Lake is linked with Bonnie Glen, it



Casing is being run at this recently-completed well in the Bonnie Glen area of the Wizard Lake-Fiveland D3 reef trend which currently is one of the most active areas in Alberta.

Underfloor view of christmas tree on Fiveland discovery well, fifth in a line of prolific D3 Devonian reef fields extending southwest of Leduc field. Crude is of about 40 gravity.

seems apparent that a field of perhaps major proportions is in sight.

The Fiveland discovery, six miles southwest of the Pigeon Lake find, encountered 491 feet of D3 pay zone above water level, including 253 feet of wet gas cap and 238 feet of oil zone. Fiveland was discovered in July.

An important wildcat about midway between Pigeon Lake and Fiveland is Stanolind Oil and Gas Company-California Standard's Pigeon Lake 1. Hopes had been expressed that this well might indicate a connection between the two fields but its current status is indefinite. The D3, for the greater part, was found wet but a test of a thin section above water level recovered a flow of 6 million cubic feet of gas and some naphtha. Well was completed as a D3 wet gasser. Gas also was found in the Viking sand.

Production Data

Production in this trend occurs primarily in the Devonian D3 reef although oil is found also in the D2 in some areas. In some parts of the trend also, some oil is found in the Lower Cretaceous and gas in the Viking sand. Wells usually are completed in the D3, at depths ranging from 6200 to 7200 feet and generally are brought in flowing without acidizing and with moderate gas oil ratios. Initial production rates vary but range from 500 to over 1000 barrels per day. D3 oil gravity ranges from 38 to 41.5. Maximum allowables per well range from 233 to 321 barrels per day. Crude is shipped by pipe line to refineries in the Edmonton area.

There are now about 16 rigs running in the area and, to date, some 70 to 80 wells have been completed as producers. Principal operators are Texaco Exploration Company, McColl-Frontenac Oil Company, British American Oil Company Limited, Canadian Gulf Oil Company, The California Standard Company, Husky Oil and Refining Limited and Phillips Petroleum Company.

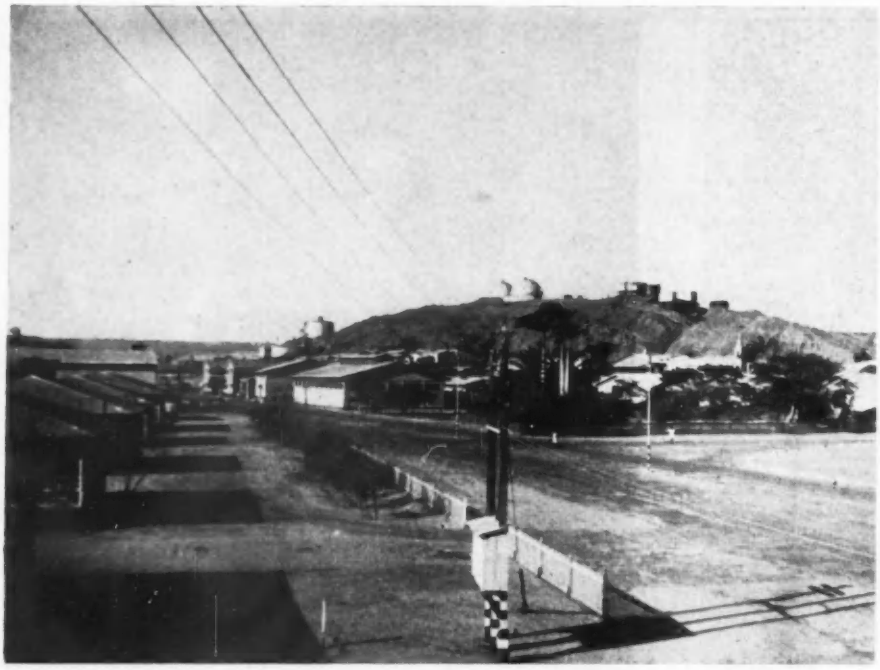
The Texaco Exploration Company has been in the forefront in discoveries, having discovered the Wizard Lake field, Bonnie Glen and Pigeon Lake. Glen Park was discovered by British American and Fiveland by the team of Canadian Gulf, California Standard, Husky and Phillips.

Drilling Data

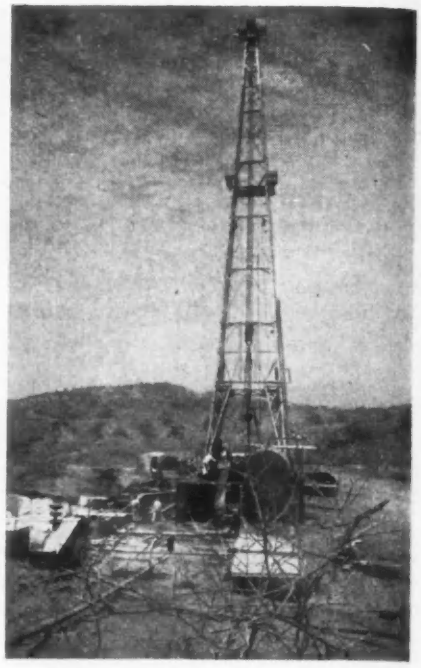
Drilling programs are conventional, with surface casing being cemented to surface at around 600 feet and seven-inch oil string being cemented at top of the D3 pay zone. Wells generally are produced barefoot. Drill pipe strings usually are four and one-half-inch, with several six-inch drill collars being used. Diamond coring generally is done in the reef pay sections.

Rigging up time ranges from two to four days, with drilling time ranging from 45 to 100 days, depending upon depth and amount of coring and testing done. Rigs used are generally of the medium size jackknife type, powered with diesel engines. From one to two mud pumps are used and two blowout preventers generally are employed. Ditches usually are excavated.

Drilling water generally is hauled from nearby lakes or ponds. Nearest tool and supply center is Edmonton, 35 to 40 miles to the northeast, and Wetaskiwin, on the Edmonton-Calgary highway, about 25 to 30 miles to the east-southeast. Road conditions generally are good, with blacktop within a few miles of the active areas and graveled or graded roads elsewhere. Terrain is level to gently rolling, some of it wooded but mostly under cultivation. Prevailing footage rates in the area range from around $7 to $8 per foot.



This is the town of Lobitos, operating center of Compania Petroleo Lobitos.



Here is a Zoritas field drilling rig.

There's Oil in Peru's Montana

But the region is remote and many millions of dollars separate it from accelerated exploration . . . even under the nation's new law.

By DR. JUAN E. RASMUSS
Petroleum Consultant, Lima, Peru

THE VAST PROSPECTIVE area of the Peruvian Montaña situated between the Andes and the Brazilian Shield, contains many oil seeps from the Ecuadorian border in the north to Madre de Dios on the Bolivian frontier and the Urubamba river in the south.

Geologically, it represents the border region of the Andean geosyncline to the Brazilian Shield in the east, which constitutes a separated irregular basin in the Upper Jurassic. An alternation of sandstones and shales and rare limestones of 20,000-foot thickness, produced by the oscillating transgressions and regressions from the west and north, characterizes the oil-bearing Cretaceous and Tertiary sequence.

Oriente formation, or Aguas Calientes series, in which Compania de Petroleo Ganzo Azul., Ltda., found rich strikes, covers unconformably the different older formations—Ordovician shales in Contaya, Permian limestones in Shira and Pachitea regions and Upper Jurassic and the so-called Sarayaquillo sandstones elsewhere.

Its age has been considered Lower Cretaceous, but lately has been put in Middle Cretaceous. It is overlain by Upper Cretaceous Chonta shales and limestones and Vivian sandstone. The existence of Permo-carboniferous reef-type limestones from the upper Urubamba over Ganso Azul's area to Ecuador is of possible significance. The only production in this area is found at Agua Caliente in the Middle or Lower Cretaceous.

This is the second of two articles describing the Peruvian oil industry and its attractions for foreign capital under the nation's new petroleum law.

The geological position of the Peruvian Montaña between the Andes in the west and the Brazilian Shield in the east is comparable to the Canadian prairie fields, the Rocky Mountains and the Canadian Shield.

Oil was discovered in Ganso Azul's first well, but development of this rich field has been handicapped by lack of transportation. Geological field work has been conducted since oil was found throughout the Montaña by Shell Oil Company, IPC and Socony-Vacuum Oil Company. However, the only drilling has been done

Left is the National Compania de Petroleo El Oriente's Pisqui well 1, drilled on the broad anticline in the jungle on the Pisqui River. Oil and gas has been found in this area at 7710 feet. In the background (right) lies the oil-producing Organos anticline.

by the national Compania de Petroleo El Oriente and the government.

Exploratory Wells. Oriente's initial exploration well, 2600 feet deep, was situated on one of the anticlines of the Contamana hills at Canchahuayo on the eastern side of the Ucayali river. At 2500 feet it struck sienodiorite after passing a reduced section of the Oriente formation and Upper Jurassic. The Brazilian Shield is uplifted in this region, as well as probably in the neighboring Brazilian Acre territory.

On the western side of the Ucayali river and south of Orellana, an exploration well was drilled by the government on the small Santa Clara dome, but had to be abandoned at about 11,000 feet because of equipment limitations.

Two other Oriente exploration wells were situated on the broad Pisque anticline on the Pisqui river, about 60 miles north-northwest of Ganso Azul. The first became stuck at 4650 feet. The second, which reached almost 9000 feet, drilled through the lower limit of the Tertiary Red beds at 4360 feet and entered Vivian and Chonta in the highest section of the Oriente formation. However, this well was abandoned because of the light rig used. An oil and gas show was found at 7710 feet.

El Alto Field. In northern El Alto field, from which a substantial share of Peru's production is obtained, crude is produced primarily from shallow wells in Upper Eocene sands. An operating agreement was entered into recently under which IPC will develop an intermediary area on the high marine Quaternary terrace. About 7000 barrels of crude have been produced.

Compania Petrolero Lobitos has increased its own production to about 10,000 barrels a day from approximately 1000 wells. Higher rates of recovery are expected to result from current repressuring and conservation efforts.

Empresa Petrolera Fiscal's production reached about 370,000 barrels in 1952. In contrast with other South American government exploitations, EPF is handled as a private company.

Zorritos and Organos Fields. Zorritos and Organos concessions, EPF's only producing fields, were purchased from the former Piaggio interests. Drilling was begun in 1865 at Zorritos field, one of the world's oldest oil fields. It now is almost depleted, yielding about 50 barrels daily from 35 wells. Three deep exploration tests, drilled during the past few years by Dunlap & Graham, Inc., of Long Beach, Calif., were failures.

Well 1, with a depth of 6894 feet, passed the Miocene Zorritos formation and the Oligocene Heath shales and Mancora sandstones, striking only salt water.

Wells 2 and 3, 5485 feet and 4603 feet deep respectively, touched granite and crystalline rocks. The basement is uplifted in the northern region.

Organos field to the south, situated between the Lobitos concessions, is on a pronounced anticline of Upper Eocene Pozo shales and Verdun sandstones. It yields currently about 1300 barrels daily from approximately 40 wells, each of which was drilled to about 2000 feet.

Secondary Recovery Methods. Gas repressuring has been in use for years. Casinghead gasoline is recovered by various stations throughout the field, and about half the gas is reinjected. Almost a million barrels of natural gasoline is recovered annually, in addition to about 30,000 barrels of butane, propane and hexane.

Six Mile Pool is an example of gas repressuring. Gas pressure has been maintained steadily for more than ten years, and a total recovery of about 80 percent of the existing oil is expected.

Water-flooding is used from the lower sections in Lagunitas field, but the oil is confined to pools in the four principal structures. And in the south, a large syncline, extending south of Lagunitas, offers no prospects. Therefore, reserves are limited and exploration extremely difficult by the small extension of the new pools.

Lobitos fields to the north contain comparatively large reserves. In the southern field, east of Lobitos, two-thirds of the production is found in the Parinas sandstone, called the Lower Caverno, at a depth of approximately 4000 feet. Several new pools have been developed recently.

Reserves. Total cumulative production of the coastal area amounts to about 433 million barrels, including 1952 output, of which 346 million barrels were accounted for by International Petroleum Company's La Brea-Parinas field. Proven crude reserves of the coastal fields can be calculated now at 150 million barrels, 75 million barrels of which are attributed to La Brea-Parinas field. Lobitos reserves may exceed 60 million barrels, and EPF's Organos field can be estimated at about 10 million barrels.

Taxation. If tax conditions in the coastal area are not so attractive to foreign capital, it must be remembered that oil has developed into an extremely important political factor and that the nationalist elements, favoring nationalization as in Argentina, Brazil, Chile and Mexico, fought against the law.

On the other hand, conditions gov-

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. . . with increased reach (bowed height) of springs to provide AMPLE ALL-AROUND cementing space for ALL casing programs, and VARYING hole sizes and conditions, PLUS unsurpassed convenience and ease of installation.

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20 Range HINGE-LOK
Casing Centralizer

PRODUCT NO. 9112

Recommended where LESS-THAN-NORMAL CLEARANCE exists between the casing ON which the centralizers are mounted and the casing THROUGH which the centralizers are run. If the formation is such as to create special problems of over-size or irregularity of the open hole, it is often advisable to run the "H-20" Centralizer on the first few joints—for ease in starting—followed by the "H-25" or the "H-50" Super-Range Centralizer.

BAKER MODEL "H"
25 Range HINGE-LOK
Casing Centralizer

PRODUCT NO. 9113

Recommended where NORMAL CLEARANCE is present, and no serious problem of over-size hole is anticipated. The "H-25" Centralizer is recommended where conditions are such that starting force would be a problem with the "H-50" Super-Range Centralizer, in which case the H-25 might be used on the first few joints and the H-50 run above it. Although the H-50 requires a larger spacing interval for easy starting than the H-20 or the H-25, fewer "H-50" Centralizers—with their superior reach—ensure even greater effective centering force.

"Reach" (Bowed Height) is vital factor

All Baker HINGE-LOK Casing Centralizers have greater reach (or bowed height) of springs in corresponding ranges than any other casing centralizers on the market.

Increased reach means adequate, all-around cementing space even though the hole size varies considerably from the drill bit size. Without this increased reach, it is quite probable that casing may contact the wall of the hole between centralizers resulting in a poor cement job at that point.

Hinged for easy mounting

Baker HINGE-LOK Casing Centralizers can be *installed in a matter of seconds* while running-in, as *no welding is required*. Just close the HINGE-LOK Centralizer *around a coupling* and then insert drive nails which *thread themselves* into the hinge knuckles, and *will not come out*. When exact spacing is desired, easily installed Stop Rings can be plug-welded at required positions.

Maximum effective centering force

Baker HINGE-LOK Casing Centralizers provide the most uniform annular cementing space around the casing. And this cementing space is present regardless of repeated flattening of the springs in a deep well, or of off-vertical condition of the hole.

The engineered bow shape of the springs, with an ideal relationship between the length and the bowed height of the springs, provides *greater landed centering force* than can be obtained from any other available hinge-type centralizer covering the same range of hole sizes.

All springs work together

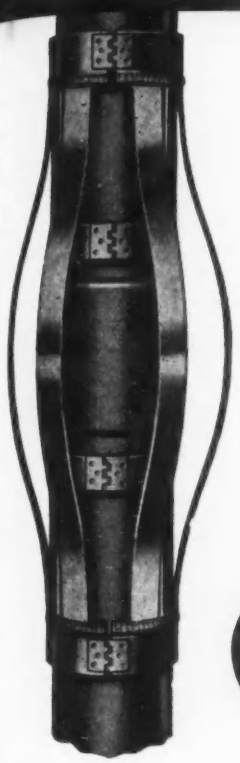
All of the powerful springs of Baker HINGE-LOK Casing Centralizers work together to offer a combined positive resistance against any tendency of the casing to contact the wall of the open hole. As the springs are forced toward the casing by contact with the wall of the hole, their effective length is decreased, thereby stiffening them and increasing their resistance to further deflection.

Unlimited rotation of casing

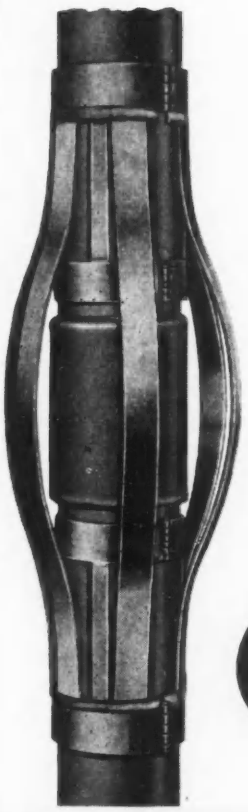
Whether Baker HINGE-LOK Casing Centralizers are installed around couplings or over a standard Stop Ring, the casing can be freely rotated without rotation of the centralizers.

Easy starting without snubbing

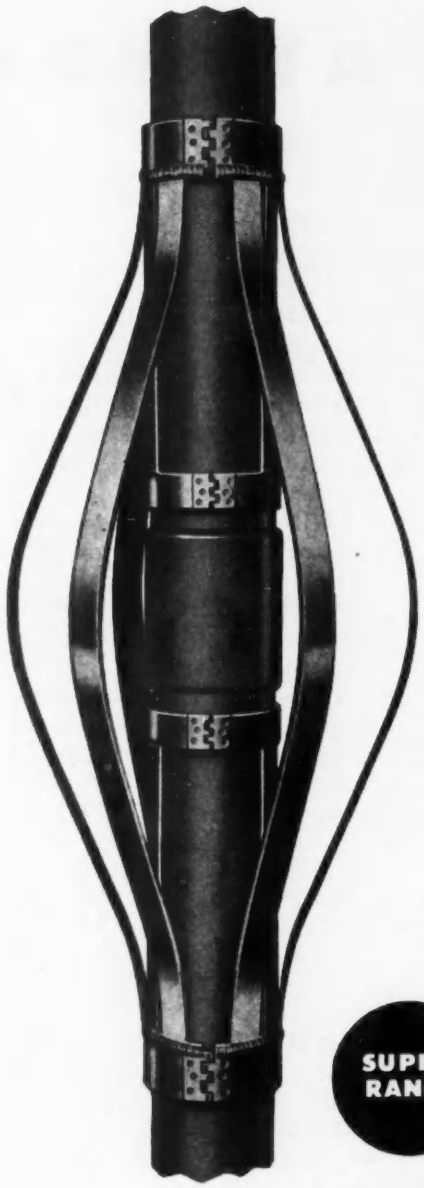
The superior spring design of Baker HINGE-LOK Casing Centralizers assures easy starting without sacrificing the powerful centering force delivered after full down-hole travel of the casing. By following the easily read "Starting Force Spacing Guide," all need for applying external starting force is eliminated even in relatively close-tolerance programs.



20 RANGE



25 RANGE



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BAKER MODEL "H-50"
Super-Range HINGE LOK
Casing Centralizer

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Recommended for GREATER-THAN-NORMAL CLEARANCE—wherever the diametral clearance between the casing ON which the centralizers are mounted, and the casing THROUGH which they are run exceeds five inches, or for NORMAL CLEARANCE where extensive hole irregularities are anticipated. No other centralizer can provide such effective centering action as the "H-50" in *irregular or over-size hole sections, or in cavities.* By increasing the bow of the springs (without proportionately increasing their resistance to starting) maximum centering efficiency is assured, regardless of individual well conditions.

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Maximum Centering Force

THROUGHOUT THE ZONE

TO BE CEMENTED

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Baker HINGE-LOK Casing Centralizers are always "pulled" during upward or downward travel of the casing in the well. This feature is important when the centralizer passes through any tight spots in the hole—and is especially advantageous when reciprocating casing during cementing operations.

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Any Baker representative, or office, is ready to give you the kind of service every operator appreciates—sincere, courteous assistance to help you get successful "first-time" cementing results.

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erning exploration and exploitation in the Montaña, the Peruvian Amazon basin, are favorable. There, the term of exploration is ten years. Exploitation leases are fixed at 50 years, and may be extended to 75 years.

Overall income tax is set at ten percent for the first ten years of exploitation, with a three percent tax levied on exported crude. Surface tax is fixed at about 6.5 cents an acre. A 27.5 percent depletion allowance is allowed.

In the coastal area, because of its easy access, taxation is heavier. It was here, in the Sechura district, that IPC bought oil rights several years ago under conditions admittedly favorable to the government. However, that contract was rejected by Congress and public opinion because of its monopolistic character.

Coast area concessions are offered under exploration terms of five years and exploitation terms of 40-60 years. Taxation is based on 50 percent of net earnings, with 20 percent tax on exported oil augmented by other taxes totaling two percent. Surface tax for exploitation concessions begins at 26 cents an acre. Coastal area depletion allowance is limited to 15 percent for foreign companies and ranges up to 25 percent for national companies.

An additional advantage for operators is the new provision that taxation on concessions along the coast, in the mountains or Amazon basin will be levied under one title and considered as a single unit. Therefore, concessions with a high yield may be counter-balanced by others of low production.

Only slight changes in the original draft of the new law have been introduced in Congress. The most important is that, in the case of adapting existing concessions to the new law, the term will be counted from the original dates, just as in Venezuela. This provision is favorable to new companies.

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(Second of Two Parts)

A WORLD of OIL

By DON KLIEWER,
WORLD OIL Staff

AFGHANISTAN: The government reportedly has suspended the United Nations sponsored drilling program in the northern province of Mazar Sharif.

PAKISTAN: Gasoline rationing is expected in Karachi. Aim: to conserve foreign exchange.

CHINA: Geologists reportedly are studying Tibetan oil possibilities. Petroleum deposits have been reported in Eastern Tibet, north of Assam, which may be linked to Sinkiang or Assam oil fields.

ALASKA: Plans have been announced for suspending the $50 million Navy project to find oil off Point Barrow. Likewise, the Navy will cancel a request for $9,700,000 appropriations with which would would have been carried on next year.

ADEN: More than 4000 men, including 900 British and American experts, are at work on the site of Anglo-Iranian Oil Company's new refinery on the Red Sea.

SICILY: D'Arcy Exploration Company, prospecting subsidiary of Anglo-Iranian Oil Company, has complete geological and gravity surveys in the southern and eastern parts of the country . . . A seismic survey is scheduled for early completion, at which time results of the work will be analyzed.

ITALY: The International Permanent Council of the World Petroleum Congress has elected to hold the Fourth Congress at Venice in 1955.

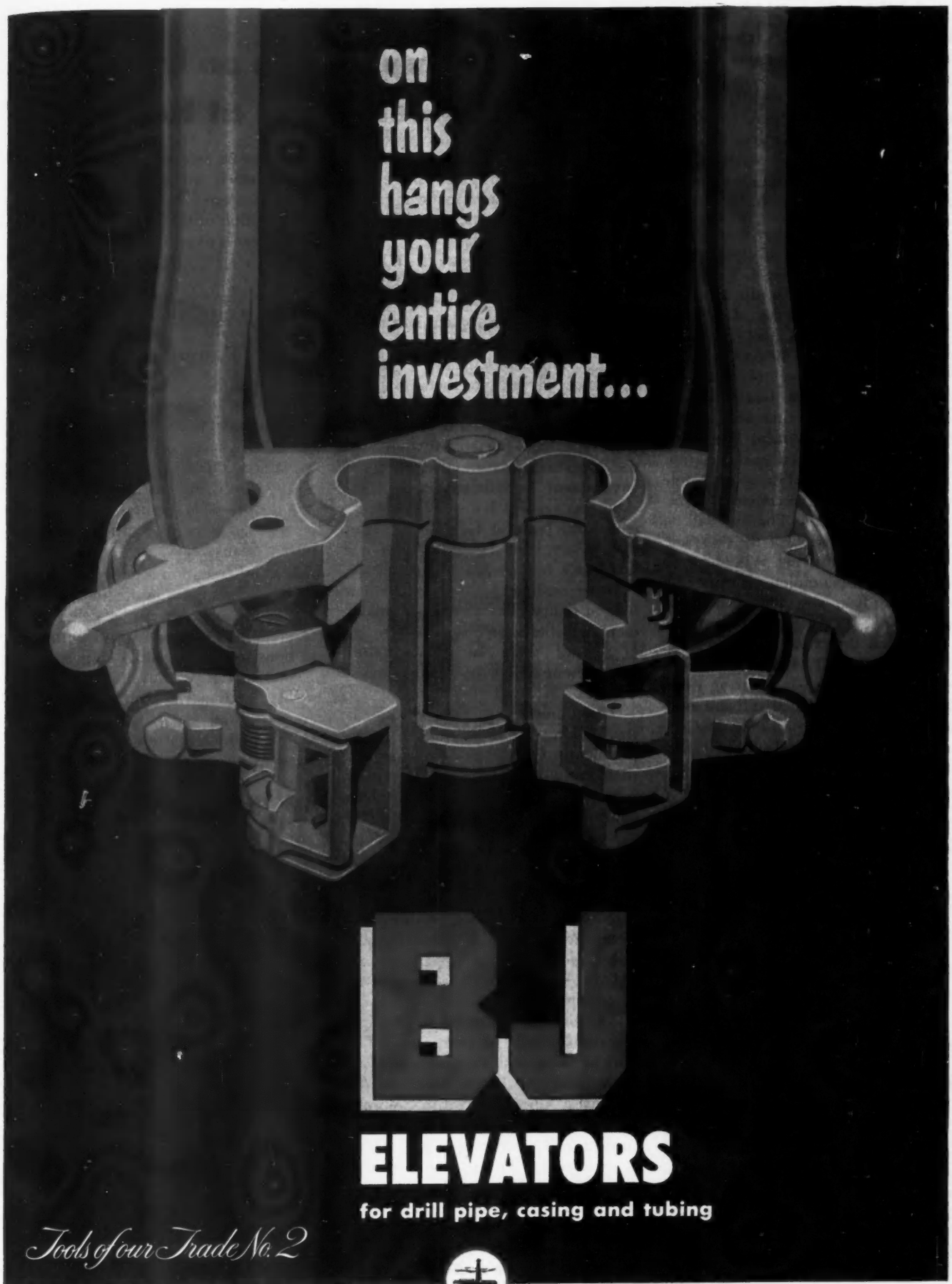
MEXICO: A Cities Service Company subsidiary is continuing its support of an exploratory program in the shallow waters of the Tamiahua Lagoon, south of Tampico, in a search for an extension to the prolific Golden Lane fields. Four wells have been drilled, and two have had encouraging shows of oil.

CZECHOSLOVAKIA: Under terms of a recently-signed trade agreement, Roumania is scheduled to deliver about 9 million barrels of oil and oil products to Czechoslovakia during 1953-1954 in return for Czech mining machinery, pipe line equipment and refining plants . . . On February 23, two days after the signing of the Roumanian pact, Czechoslovakia closed a deal with Albania: Albania will deliver asphalt in return for complete electrical power plants, machinery and paper.

ROUMANIA: The first turbobur drilling rig was erected in the Moldavia field in February, thus introducing Soviet machinery into SovRum Petrol enterprises . . . Currently, a second turbobur rig is in operation at the Zemes oil field well 276, and it is claimed that drilling is proceeding at twice the speed.

WEST GERMANY: The well Boostedt 5 of the joint interest group Vacuum-Dea-Preussag, situated southwest of the discovery well Boostedt 1, has struck oil at a depth of 5968-6017 feet with an initial daily yield of 176 barrels. This new field in Schleswig-Holstein now has four producing wells . . . Except for the well Aldorf 1 in the newly-discovered Aldorf field, near Diepholz (between Bremen and Osnabrueck), Wintershall AG. has begun regular production from Aldorf 2 and 4. Aldorf 3 is being readied for production. These four wells prove that a prolific oil deposit has been opened up at Aldorf . . . German fields produced 1,061,273 barrels of oil in February which amounted to a decrease of 91,871 barrels from January. The decrease was credited to the short month, for the daily average production of 37,900 barrels was a new peak. Remarkable yields were obtained from the new oil fields opened up in Schleswig-Holstein and in the Upper Rhine Valley. Boostedt, near Nuemuenster, produced 11,237 barrels, Ploen 6360 barrels, Aldorf 5859 barrels, and Rot, near Heidelberg, 1413 barrels.

EAST GERMANY: Reports that crude is being produced near Anklam,



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West Pomerania, and Bergiesshuebel, in the Erzgebirge mountains in Saxony, are incorrect. The only place in the Eastern Zone with regular oil production is the well Fallstein 1, west of Magdeburg, which was drilled under a government drilling program in the 1930's. It currently yields about seven barrels of oil daily.

CANADA: Sturgeon Petroleums and associates have indicated an oil well producing from the Lower Cretaceous structure in southeast Saskatchewan, three-fourths of a mile south of the Wapella pool. The test between 2229 and 2240 feet resulted in recovery of 255 feet of clean 25-gravity crude and 250 feet of oil-cut mud. The well is coring and testing ahead . . . Interprovincial Pipe Line Company has received authorization from the Board of Transport Commissioners, Ottawa, to construct a six-mile line into Sarnia. The line will be the Canadian portion of the 635-mile pipe line from Superior, Wisconsin, to Sarnia and will complete the pipe line now in use from the Alberta fields to Superior . . . Alberta's government will auction the plant it built for experiments on extraction of oil from Athabasca tar sands . . . During 1952, Alberta wells produced oil and natural gasoline at the rate of 162,556 barrels daily, or a total of 59,495,596 barrels, a 27 percent rise from the previous year . . . Daily average yield in Alberta this year is expected to top 215,000 barrels, possibly reaching a peak of 290,000 barrels a day by fall . . . Amerada Petroleum Corporation has again drawn attention to the Peace River area of northwest Alberta with a discovery in the D3 Devonian. The discovery came at Amerada-Crown No. "R" Fs-19, eight miles southeast of Sturgeon Lake.

Pakistan Petroleum Ltd. Spuds-In New Test Well

Pakistan Petroleum Limited has spudded-in a second well at Sui, Dera Bugti, to determine whether an extension exists to the limestone in which gas was found in Sui well 1, five miles from the second exploratory test.

Pakistan Petroleum, formerly the Burmah Oil Co. (Pakistan Concessions) Limited, is conducting major tests also in East Pakistan. A deep test at Chak Naurang in the Punjab recently discovered oil in a new structure.

Canada Clamps Down on Exports Of Gas to Meet Needs at Home

Canada's Liberal government in Ottawa and the Social Credit government of Alberta have made it crystal clear what their policies will be on the issue of gas export.

Federal Trade Minister C. D. Howe has told the Ottawa House of Commons the dominion government will approve no further applications to export gas from Western Canada to the United States until the needs of Ontario and Quebec are met by an all-Canadian pipe line.

Premier E. C. Manning and Attorney General Lucien Maynard told the Alberta legislature the provincial government "is definitely in favor" of exporting gas which the Alberta Petroleum and Natural Gas Conservation Board decides is surplus to the province's requirements.

Howe outlined a major decision in federal policy. The Canadian government will block export of gas to the U. S. until "there can be no economic use, present or future, for that gas in Canada."

The minister emphasized that he was talking about natural gas, not petroleum. Oil, he said, is a product that moves freely across the international border. There is no problem of continuity of supply.

But as far as gas is concerned, it is to be a policy of "Canada first."

Two permits for limited gas export have been approved by Alberta in the past two years. The first permitted gas from the southern Alberta Pakowki Lake field to go to Anaconda Copper Mining Company's workings in Montana.

The second, approved by the conservation board last year, allowed export by Westcoast Transmission Company from the Peace River area of northwest Alberta to British Columbia and the U. S. Pacific Northwest. This project still awaits approval of the U. S. Federal Power Commission.

In granting Westcoast's application, the board turned down applications by Northwest Natural Gas Co., Western Pipe Lines, Prairie Pipe Lines Ltd., McColl-Frontenac and Union Oil Co. Ltd., and Canadian Delhi Oil Ltd.

The board will resume export hearings in Calgary May 11. The five applications rejected last year are expected to be renewed, and Canadian Delhi, which would build an export line to Eastern Canada, appears in the best position of the five in the light of the latest government pronouncements.

Trans Mountain Studying Fourth Pumping Station

Addition of a fourth pumping station, which would boost initial capacity of the line to 150,000 barrels daily, currently is being considered by Trans Mountain Oil Pipe Line Company. Studies are being carried on to ascertain the probable requirements of prospective shippers to learn if another station is necessary.

If another station is added, it would be the second boost in the line's capacity before completion of the line. Original plans called for two pumping stations with an initial capacity of 75,000 barrels per day. In July, 1952, a third station was authorized to increase initial capacity to approximately 120,000 barrels daily.

According to the 1952 Annual Report of the Trans Mountain Oil Pipe Line Company, construction of the line has proceeded according to schedule, with approximately 45 percent of the job completed by the end of 1952. It is anticipated that the job will be completed this August, with crude oil reaching Vancouver during October.

Surveys of the company have shown that by building additional pumping stations, up to a total of perhaps 12 or 14, the pipe line ultimately could transport about 300,000 barrels per day.

Attock's Pakistan Crude Production Up Sharply

The Attock Oil Company of Pakistan produced 989,545 barrels of oil during 1952 as compared with 672,740 barrels during the previous year. The new wells at Dhulian were largely responsible for this 47 percent rise.

At Dhulian, the oil horizon was discovered at 8260 feet, 600 feet below the former main oil horizon. Three

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wells are currently in production there, and preparations are being made to deepen one of them to increase the yield.

The company said the latest strike in the Dhulian area indicates that crude production can be increased considerably.

At Balkasar, crude production during 1952 was considered satisfactory. The second test well at Bains has reached at depth of 2075 feet. The test hole at Dhariala has reached 4159 feet, where heavy flow of water was encountered. Attempts are now under way to seal off the water to permit deepening.

Israel Is Divided Into 4 Concession Districts

Israel's National Oil Council has divided the nation into four divisions to more easily control concessionaire activities.

The south district consists of the Elat and Beershaba districts; the middle sector is bordered by the coast on the west and reaches to Kfar Witkin; the northern section from Kfar Witkin down to Galil; and the fourth district incorporates the Jordan valley.

Soviet Drilling Revision Is Claimed Successful

The rotary system of drilling, widely used behind the Iron Curtain, has reportedly been revised so the entire drilling shaft does not rotate. A smaller motor, it is claimed, is built to the drilling end near the bit, substituting for a surface motor. It is also claimed that this eliminates twist-offs. The rotor engine is fed its fuel through the hollow drilling shaft.

Drilling time is reportedly reduced 20 percent, and the lack of torsional tension of the shaft permits a longer operation between repair jobs.

Production to Start in New Yugoslavian Field

Production in the newly-discovered Yugoslavian oil deposit near Bunjane began during the first week of January. The deposit, estimated to contain 2 million barrels of crude, will increase Croatian production by 25 percent. In 1953, a total yield of 775,000 barrels is expected in Croatia.

The new field of Klostar has an estimated reserve of 6,750,000 barrels, and production also is scheduled to commence there immediately.

Geophysical research is being conducted near Glavnicia-Zelina, in the Zagreb district. Also proposed this year is the mapping and study of the area from Zagrebacka-Gora to Vrbousco.

Ontario Drilling Bonds Will Control Exploitation

As a measure of controlling exploitation of boring permits over sizable acreage, the Ontario Government has ruled in an order-in-council that oil men must deposit a $25 bond per square mile for boring rights in the province. The bonds will permit exploration and prospecting for petroleum or natural gas possibilities in the province but will tend to control the amount of acreage being tied up by individuals or companies.

Recently Overland Industries Limited, Calgary, was granted boring permits on 1300 square miles in the French River district, but as the order-in-council is not retroactive the ruling will not apply to that acreage. However, since that date additional applications have been made from individuals and, fearing acreage exploitation, the government took the above action.

High-Gravity Oil Found On Plains of Alberta

The first discovery of high-gravity crude oil on Canada's Alberta Southern plains has been made at Eyremore, about 54 miles northeast of Lethbridge, by Royalite Oil Company, Ltd., Anglo-Canadian Oil Company, Ltd., and associated oil companies.

The well, Royalite-Anglo-Eyremore 1 was the first in southeastern Alberta to successfully test the Devonian formations which are productive in northern and central Alberta sectors.

The well struck the Three Forks formation at 4778 feet and in one-hour test between 4781 and 4790 feet recovered 2700 feet of 41.6 gravity oil, with gas flow rated at 50 Mcf daily and some naphtha.

Casing now is being run and the well will core and test ahead in the D-1 zone.

Banff Oil Ltd.

announces the election of

- **WALTON H. HOHAG, Jr.**

as Vice President, Director and General Manager effective March 17, 1953

- Mr. Hohag, Jr. until recently was a Director, Vice President and Manager of Exploration of Socony-Vacuum Exploration Company

Banff Oil Ltd.
Head Office: 809 Eighth Ave. West,
Calgary, Alberta, Canada

How To Get The Most Value From The Exposition

WORLD OIL provides helpful services to enable oil men to get the most from the International Petroleum Exposition. This assistance consists of three phases:

1. Descriptions and illustrations of new exploration-drilling-producing-pipe line equipment to be displayed at the exposition.

The following pages of this issue constitute a special added editorial section devoted to descriptions and illustrations of newly introduced or improved equipment for exploration—drilling—producing—pipe line operations which will be on exhibit at the exposition.

By being published two weeks in advance of the exposition, these descriptions will enable oil men planning to attend the exposition to pick out new tools and equipment which they will want to be sure to see. The location of the exhibit on the exposition grounds is given for each company, so all displays of special interest may be found easily when at the exposition.

These descriptions also will serve to help bring information on new equipment to oil men unable to attend the exposition. These men can learn about the new equipment displayed even though they cannot be at the exposition to see it.

2. Convenient time-saver postage-paid postal cards for getting additional free information on new equipment.

As an additional service, WORLD OIL has provided an easy way for oil men to get more information on new products of interest to them.

Each item of new equipment described on the following pages has been given an identifying number. Whenever additional information is desired, just circle the identifying number given the tool on one of the two blue-colored postal cards which appear on pages 315 and 316 in this issue. Then put your complete mailing address at the bottom of the card and drop it into the mail. No postage is required if mailed in the U. S. WORLD OIL will do the rest, notifying manufacturers of the product on which you desire more information. Circle as many different identifying numbers as there are products on which you wish additional information.

We suggest that the most convenient way to use these cards is to tear them out now, and have them handy so you can circle the identifying numbers as you read through the pages in this section.

Those attending the exposition may wish to do this even though they plan to inspect the tool or device at the exposition. In this way they can have material which will refresh their memories later and make it unnecessary for them to collect and carry home a large package of literature from the exposition.

Those unable to attend the exposition will find this a convenient way to get additional information on all items of interest to them. They will be up-to-date even though not able to go to the exposition.

3. A Handy guide book (classified directory) to products displayed, with map of exposition grounds, available.

As a special service for those attending the exposition, WORLD OIL and its sister publication, *Petroleum Refiner*, have compiled and published a special classified directory of equipment on exhibit at the exposition.

This booklet is similar to the classified section of a telephone book. Companies and their exhibit locations are listed under different types of equipment. For example, all companies exhibiting drawworks will be listed under that heading, etc.

The booklet will make it easy for those going to the exposition to find, with minimum effort and time, the location of any type of equipment they may want to see.

Copies of this handy guide directory, which is accompanied by a fold-out map showing the locations of booths and outside exhibits on the exposition grounds, may be obtained by either (1) writing WORLD OIL now to get an advance copy or (2) by coming by WORLD OIL's exposition exhibit in Booths 149-150-181-182, Oklahoma Building.

We will be glad to see you.

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Equipment Exhibits

At International Petroleum Exposition

Acme Fishing Tool Company

Booths 47, 48, California Building

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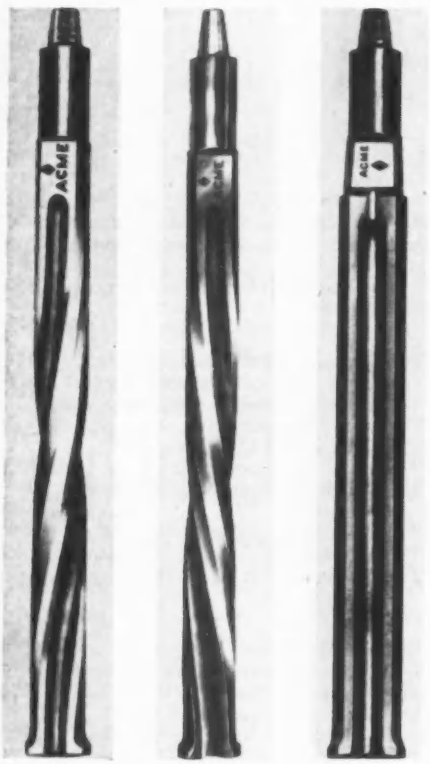


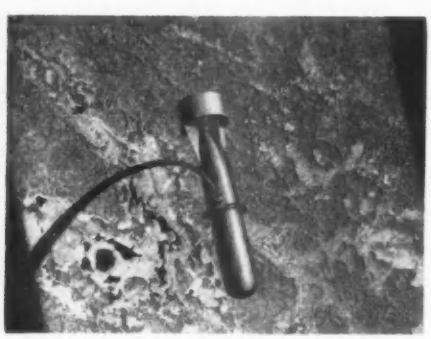
Right Left Straight

Acme's "Big Chief" Alloy Drilmor Bits come now in "twisted" (right or left hand) as well as "straight" style. Designed to drill the hardest formations, they hold cutting edge, wear well, and resist battering in sharp sands and tough drilling.

Circle No. 1 on Postcard, Page 315

Aero Service Corporation

Booth 28, Scientific and Technical Building



NEW PRODUCTS DISPLAYED:

Photo and mosaic coverage of the Williston Basin and other western areas. Detailed stereo-photos for photo geologic study. Controlled photo-mosaics in 15 minute quadrangles, at a scale of two inches to one mile—over 200 square miles on one quad. Aerial mosaics can be used as a base map, and detailed geology and contour lines can be transferred to these photo-maps.

Circle No. 2 on Postcard, Page 315

Airborne magnetometer surveys of the Basin and other areas of the West and Southwest. Detailed magnetic studies to aid the geologist and geophysicist in locating areas of prime interest. Important magnetic data is compiled in magnetic maps which are a very useful "first tool" in exploration programs.

Circle No. 3 on Postcard, Page 315

A-1 Bit & Tool Company

Block 104

NEW PRODUCTS DISPLAYED:

The N-35 Rotary Side Wall Core Barrel is a reduced replica of the standard A-1 Rotary-type side wall core barrel and is designed for operation in open holes as small as six inches in diameter. The tool will cut a core from any specified depth without compressing or contaminating the core and is designed to take cores with enough length for complete analytical tests.

Circle No. 4 on Postcard, Page 315

The Eccentric Guide Casing Mill is an expanding type of casing mill with much longer and heavier knives than previously used. It has a guide rib in the body of the mill which actually throws the path of rotation off-center or eccentric. This action causes the knives to cut with a sawing action, getting full use of the cutting edge of each knife.

Circle No. 5 on Postcard, Page 315

The A-1 Burris Key Seat Wiper is a drill collar assembly consisting of two bumper subs, a mandrel, and a slip jar sleeve, and is designed to prevent sticking drill pipe in key seats on coming out of the hole. The steel sleeve which is of a slightly larger OD than the drill collar, contacts all key seats first. The square, sharp shoulder of the sleeve actually cuts into the key seats, wiping them to a passable OD. When a key seat is small enough to stick the sleeve, jarring action may be applied in both directions by slacking off and taking up the drill pipe. This wipes the key seat out and permits easy retraction of the drill stem.

Circle No. 6 on Postcard, Page 315

The Sure Shot Deviation Recording Instrument uses a simple plumb bob to measure the angle slope of well bore. A sharp steel needle is positioned in the nose of the plumb bob which is suspended from a piston and hangs over an aluminum recording disc. The piston is spring-loaded and trigger set to a timing mechanism. When the time is up, the trigger releases the spring-loaded piston causing the plumb bob to travel down one-sixteenth of an inch, puncturing the aluminum which gives a permanent and accurate record of the angle slope of the well bore.

Circle No. 7 on Postcard, Page 315

Axelson Manufacturing Co.

Block 14

NEW PRODUCTS DISPLAYED:

The Axelson Hydraulic Long Stroke Unit is self-contained, mounted on a sturdy base, with no external piping. All components for constructing foundation are furnished. Other features include wellhead aligning flange, self-aligning and self-lubricating spring-loaded unit stuffing box, extra wide main base, ample headroom under cylinder, streamlined fluid flow channels, scavenger tank integral with base for added rigidity, welded piping wherever possible.

Circle No. 8 on Postcard, Page 315

Flanged Kennametal Seat and Ball has the Monel flange brazed to the seat. Since it is pliable and flexible, the pump can be made up tightly without danger of breaking or chipping.

Circle No. 9 on Postcard, Page 315

United States Safety Service Co.

Booth 14, Park Lane

NEW PRODUCTS DISPLAYED:

The Halo Faceshield has an all-green plastic spark protector which affords wide-angle vision and still eliminates glare from overhead lighting. A patented visor lock locks the visor in the up position or the working position and eliminates the chance of the wearer adjusting the visor so it does not afford full protection. Light weight and attractive in appearance, the Halo faceshield is available in three styles of headgear with clear or green visors and a special acid resistance visor for use around acid and chemicals.

Circle No. 10 on Postcard, Page 315

The New Saf-Hed-Hat fills a need for a more rugged safety hat with longer life that is still light in weight and comfortable to wear. It is made of fiber glass material which will not split, crack or deform. The cradle of the hat can be quickly and easily adjusted to fit all head sizes and complies with Federal specifications.

Circle No. 11 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Saf-I-Flex; Saf-I-Spec; Saf-I-Duo; Saf-I-Shield; Duo-Chem; Saf-I-Weld; Saf-I-Lens; Saf-Co-Meter; Pep-Up Impregnated Salt Tablets; Pep-Up Enteric Salt Tablets; Tuffy Apron.

Twin Disc Clutch Company

Booths 81N and 82N and Block 207

NEW PRODUCTS DISPLAYED:

The new additions to the Twin Disc line include a Two-Stage Hydraulic Torque Converter; a Two-Speed Transmission designed to extend full-range performance of three-stage torque converters; a new-type Disconnecting Hydraulic Power Take-Off, and a new-type Air-Actuated Friction Clutch.

Circle No. 12 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Three-Stage Hydraulic Torque Converter; Truck-Type Three-Stage Converter; Twin Disc Freewheel Assembly; Friction Power Take-Offs; Hydro-Sheave Drives; Hydraulic Couplings; Heavy Duty Clutches; Single and Duplex Multiple Plate Clutches; Twin Disc Line of Industrial Drives.

Joy Manufacturing Company

Block 7

NEW PRODUCTS DISPLAYED:

The Joy Model 75 Motorized Drill Rig is a truck-mounted, self-contained unit. Designed for fast shot-hole drilling, it has a rated capacity of 750 feet using 2⅜-inch drill pipe. The rotary table has a 6½-inch opening, and the mast is rigged to handle 10, 15, or 20 feet of pipe. Features include power make-up and breakout, fast retract on hydraulic feed cylinders, double drum arrangement on single shaft, both drums with equal capacity, power take-off from truck engine. The Joy 75 is a straight kelly drive machine, available with either hydraulic feed cylinder or hydraulically-actuated chain pull-down.

Circle No. 13 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Model 225 Drill Rig (1800 feet); Model 275 Drill Rig (3000 feet); Portable Air Compressors; Rock Drills; Paving Breakers; Spaders; Backfill Tampers; Hoists; Air Motors; Axivane Fans.

The American Brass Company

Booths 34-35

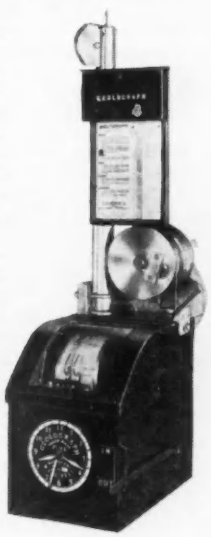
PRODUCTS DISPLAYED:

Heat Exchanger tubes—regular and duplex; Tube Sheets and Plates; Welding Rods; Flexible Metal Hose and Tubing.

Geograph Company, Inc.

Booth 49, Scientific & Technical Building

NEW PRODUCTS DISPLAYED:



The New Geograph Spring Retriever eliminates the necessity of the weight and guide line formerly used to actuate the recording mechanism. This is an improvement from the standpoint of rig safety and there is less likelihood of failure of the recorder due to line breakage. Another important advantage of the spring actuated recorder is its simplicity of installation and portability. This is of special importance to those contractors and companies making their own Geograph installations.

Circle No. 14 on Postcard, Page 315

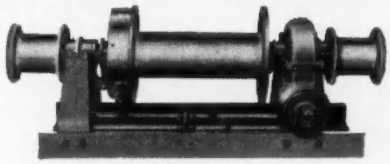
OTHER PRODUCTS DISPLAYED:

The Geograph Mechanical Well Logging Unit.

Tulsa Winch, Division of Vickers, Inc.

Block 104

NEW PRODUCTS DISPLAYED:



The Tulsa Winch powered by Vickers Hydraulic Motor was designed for extra-sensitive control of winch line and for use where source of power is removed from the winch.

Circle No. 15 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Power Winches for all Makes and Models of Trucks and Crawler Tractors; Hanger Bearings; Power Dividers; Power Take-Offs; Gear Reducers.

Lane-Wells Company
Lane-Wells Canadian Company
Petro-Tech Service Company

Block V

NEW PRODUCTS DISPLAYED:

Lane-Wells Selective Perforating Service offers both bullet and shaped-charge guns for cased or open hole perforating. A complete line of gun sizes assures the availability of the right gun size for each well. Combinations may be made of bullet and Koneshot (shaped-charge) guns to provide both types of perforating on a single trip in the wells.

Circle No. 16 on Postcard, Page 315

The **Five-Step Safe-Firing Equipment** assures safety on the rig floor during perforating operations. A special switch mounted on the rig speaker prevents discharge of the gun until it is down hole.

Circle No. 17 on Postcard, Page 315

Dualized Radioactivity Well Logging provides for running both the gamma ray curve and the neutron curve on a single trip into the well. This eliminates one run. The casing collar log is recorded at the same time to provide depth correlation markers.

Circle No. 18 on Postcard, Page 315

Slydeze Packer Slips, now standard equipment on all Lane-Wells Hookwall Packers, practically eliminate cone-slip friction. This may materially reduce the unsetting force usually involved in pulling this type of packer.

Circle No. 19 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Type D, Drillable Bridging Plugs (cast iron and magnesium types).

Republic Steel Corporation
Booths 102-115, Kansas Building

NEW PRODUCTS DISPLAYED:

Samples of Seamless Oil Country Casing made at Republic's new Seamless Tube Mill in Chicago will be five-foot lengths of J-55 Seamless Casing in 5½- and 7-inch diameters. Casing was first produced on this mill in March, 1953. Seamless Casing and Tubing will be produced in grades through N-80.

Circle No. 20 on Postcard, Page 315

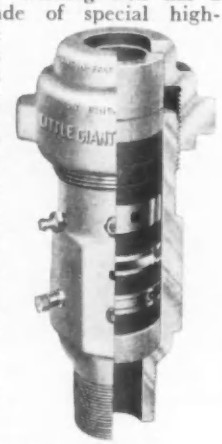
OTHER PRODUCTS DISPLAYED:

Republic Fusion Welded Line Pipe; Electric Weld Line Pipe; Electric Weld Casing; Electric Weld Tubing; Electrunite Pipe and Tubing; Niles Steel Shipping Containers; Fasteners; Various Types of Oil Country Equipment and Petroleum Processing and Handling Products made from Alloy and Stainless Steels.

Johnson-Fagg Engineering Company
Booth 29, Park Lane

NEW PRODUCTS DISPLAYED:

The Little Giant Stuffing Box has a compact body, made of special high-strength iron. The nylon wear-surfaces of the packing rings are insoluble in any oil well fluid and add life to the packing rings. The guide bearings were designed to relieve the packing of side thrust load. Lignum Vitae Wood was chosen for the bearing material because of its high compressive strength, and its 30 percent natural oil content makes it self-lubricating and non-scoring.



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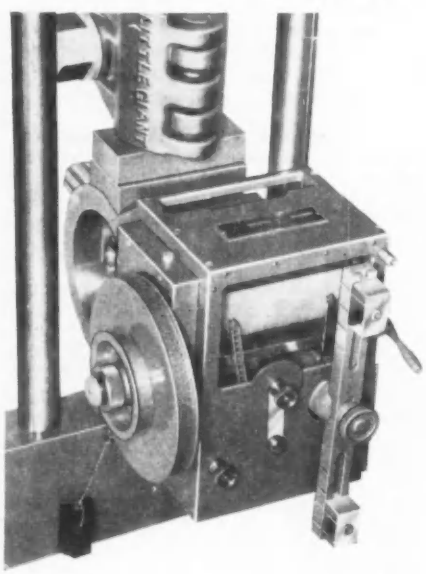
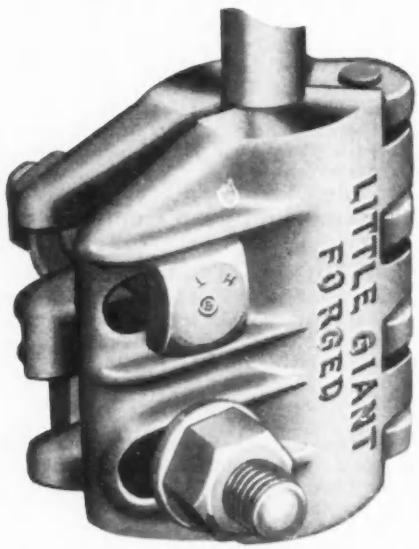


The J-F Dynamometer helps determine causes of mechanical failures by measuring and recording the pumping load at every point in the stroke. It measures the counterbalance effect at the polished rod and tells when the traveling valve in the pump opens on the down stroke. It indicates the working fluid level, the weight of the fluid, and stability of the pumping operation. It records unnecessary loads and measures the horsepower being transmitted to the sucker rod string at the polished rod.

Circle No. 22 on Postcard, Page 315



The Little Giant Polished Rod Clamp is designed for high clamping efficiency, safety, ease and speed of installation. It cannot damage the polished rod. It is forged from high grade, heat-treated steel. Certified tests prove the efficiency and safety of both models of Little Giant Polished Rod Clamps.

Circle No. 23 on Postcard, Page 315

Magnet Cove Barium Company Division of Dresser Industries
Block 11

NEW PRODUCTS DISPLAYED:

Form-A-Plug, a lost circulation material, was developed in cooperation with Magnolia Petroleum Company. It is a time-setting clay cement capable of being handled as a drilling fluid after initial mixing of the solid ingredients with water and may be pumped down the drill pipe and squeezed into lost circulation zones. After a short period, the material develops a very high gel strength which seals off the zone against further losses of the drilling fluid.

Circle No. 24 on Postcard, Page 315

Leather-Floc is another lost circulation material made up of tiny leather fibers which are very pliable and strong. These fibers swell in water, forming a very impermeable mat which resists the passage of even clear water.

Circle No. 25 on Postcard, Page 315

Alkatan is an alkaline-tannate material especially prepared to provide a safe and convenient material for the chemical dispersion of drilling mud. It has proven effective as a "breakover chemical" for lime-treated muds and as a thinning agent for the medium pH mud systems.

Circle No. 26 on Postcard, Page 315

Mylojel Preservative is a free-flowing green powder developed as a companion product to Magnet Cove's drilling mud starch, Mylojel. Low pH muds can now be used economically by protecting the starch against decomposition with Mylojel Preservative.

Circle No. 27 on Postcard, Page 315

Martin-Decker Corporation
Block 4

NEW PRODUCTS DISPLAYED:

Ideal Speed Selector is used for the selection of the most efficient drawworks hoisting speed.

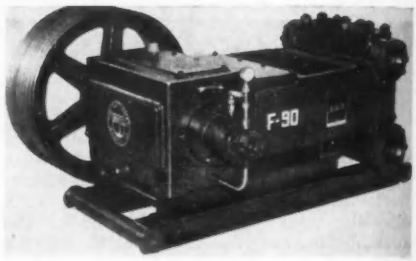
Circle No. 28 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Type "D" Weight Indicators and the Ideal Type "D" Wire Line Anchors; Type "F" Weight Indicators and the Ideal Type "F" Wire Line Anchors; Production Model Clipper "Sealtite" Weight Indicators; Clipper Tool Pusher Weight Indicator; Unitized Mud Pump Gauges; Hydro-Mech Torque Gauge; Fork Lift Gauge.

The National Supply Company
Block 1

NEW PRODUCTS DISPLAYED:



Type F-90 Triplex Pump, the first of a series of triplex horizontal plunger-type power pumps developed by this company, is intended primarily for water flooding, salt water disposal and as power-oil source for subsurface hydraulic pumping systems. This pump is a five-inch stroke single-acting pump, rated at 90 hydraulic horsepower output at maximum speed of 360 revolutions per minute, requiring 100 brake horsepower input.

Circle No. 29 on Postcard, Page 315

Spang Extreme Line Casing, Grade P-110, with a minimum yield strength of 110,000 pounds per square inch is made in the same sizes as the standard Grades J-55 and N-80 with the same external and internal joint dimensions. It provides greater collapse, bursting, and tensile strength required by well conditions of present day deep drilling.

Circle No. 30 on Postcard, Page 315

Ideal Type 110 Drilling Rig, National's newest rig, will be one of the eight new Ideal Drilling Rigs on display. The others are the T-8, T-12, T-20, and T-32, all suitable for truck or trailer mounting, and the larger Type 55, Type 80-B, and Type 130 Rigs. The Type 110 rig will be teamed up with other new equipment including two Superior 6-G-825 Gas Drilling Engines, one of which will be driving the drawworks through the new Ideal Torque Converter. The second engine will furnish power for a Type E-500 Pump through an Ideal Gyrol Fluid Drive. A new Multimatic 205-B Rotary and a new Type F Hook-Block will be operated in conjunction with the rig.

Circle No. 31 on Postcard, Page 315

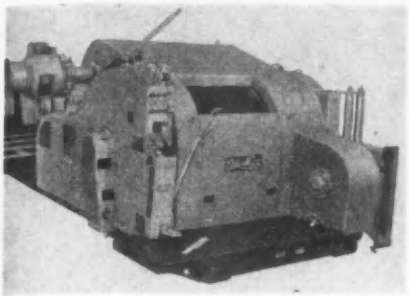
OTHER PRODUCTS DISPLAYED:

Spangweld Drill Pipe; Spangseal Tubing; Extreme Line Tubing; F-90 Triplex Pump; E-11 Pumping Unit; Surface Hydraulic Pumping Unit; Sub-Surface Hydraulic Engine; Type J. Plunger Lift; Pump Parts; Sucker Rods; Micromatic Drilling Control; Wellhead Equipment.

Oil Well Supply Division, United States Steel Corporation

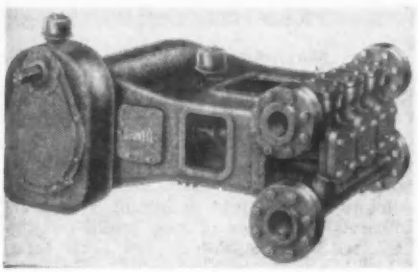
Block 2

NEW PRODUCTS DISPLAYED:



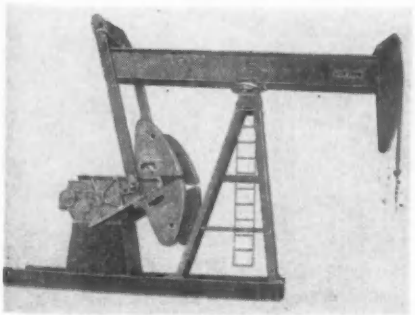
"Oilwell" No. 66 Drawworks has a three-speed transmission with reverse, giving six forward and two reverse drum speeds, three forward and one reverse rotary speeds, and is furnished with or without torque-converter drive. This rig features a built-in hydromatic brake which adds little to the weight of the rig and need not be dismantled when moving. The rig is adaptable to 2- or 3-engine drive with shaft extension to handle extra pump drive if desired.

Circle No. 32 on Postcard, Page 315



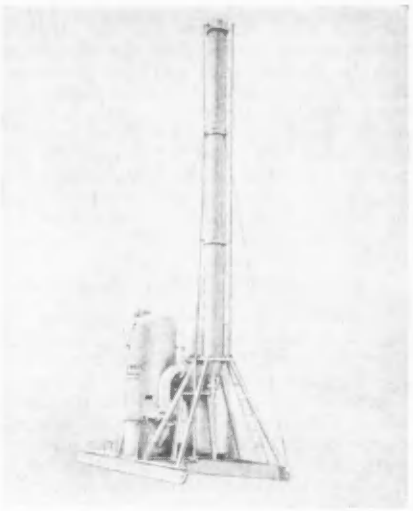
No. 344-P Horizontal Triplex Plunger Pump with its companion model, the No. 334-P, are available with a range of plunger sizes from 2 inches up to 4 inches and are capable of developing discharge pressures from 600 to 700 pounds per square inch. Designed for use with slow speed drivers, both pumps can be connected direct through a coupling, chain or belt drive. For high speed drivers a gear reduction unit entirely separate from the pump can be bolted to either side of the frame.

Circle No. 33 on Postcard, Page 315



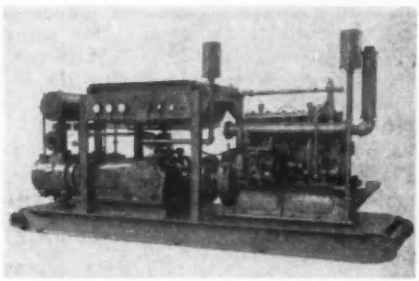
"Oilwell's" 46G25 Pumping Unit with a polished rod load capacity of 25,000 pounds is the largest unit of this series and is designed for deep well pumping. This unit features hinged-type horsehead easily rolled back for well servicing, simplified equalizer design, and quickly adjustable single-piece type "F" counterweights.

Circle No. 34 on Postcard, Page 315



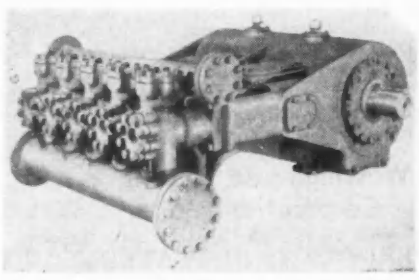
No. 2337 Hydraulic Pumping Unit is a completely unitized assembly containing working cylinders, air and fluid tanks, pumps, prime mover and regulating equipment. The entire assembly is mounted on a fabricated structural steel skid-type base ready for installation. It is designed to operate on either deep or shallow wells that have a high polished rod load.

Circle No. 35 on Postcard, Page 315



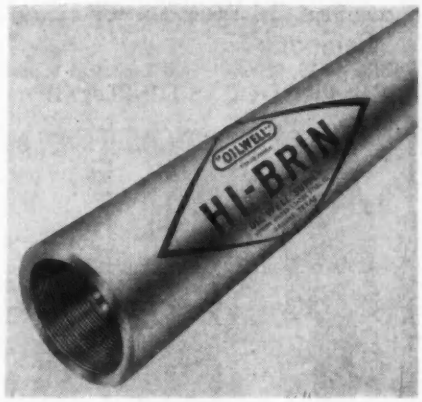
Model DGE 125-HP Gas Compressor is a direct-drive duplex-type unit which does not employ V-belts, making the compressor suitable for installation in hazardous locations. Efficient in gas-lift operations, maintenance of bottom-hole pressures, gas gathering and transmission systems, this nine-inch stroke unit can be operated with gas engine or electric motor.

Circle No. 36 on Postcard, Page 315



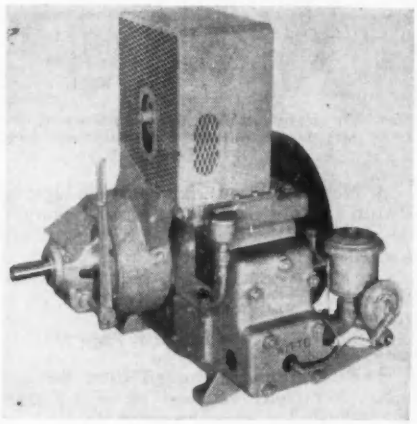
No. 558-P Horizontal Quintuplex Plunger Power Pump has a five-inch plunger diameter and an eight-inch stroke with capacity rating of 727 barrels per hour at 150 rpm maximum speed. The five overlapping plunger strokes are arranged in the best sequence for minimum turbulence of fluid flow.

Circle No. 37 on Postcard, Page 315



HI-BRIN (High Brinell) Subsurface Pump Barrels of more than 700 Brinell bore hardness have a strength rating of 115,000 pounds psi. Oilwell's patented process for hardening the inner walls of the HI-BRIN barrel gives the same hardness over the entire inner wall.

Circle No. 38 on Postcard, Page 315



Model 98 Engine is a lightweight, low horsepower, carburetor-type oilfield engine which operates economically on gasoline, natural gas, bottled gas or kerosine. The "98" is a square engine (five inch bore by five inch stroke) of compact design developing from 5 to 10 hp and has a medium speed range of from 500 to 1200 RPM.

Circle No. 39 on Postcard, Page 315

No. 818-P Power Pump is designed especially for jet bit drilling where high pressure with minimum liner diameter change is advantageous.

Circle No. 40 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

"Oilwell" No. 133-B Portable Derrick, No. 360 Crown Block, No. 300 Traveling Block, No. 214-P, No. 218-P and No. 6P-HD Power Pumps, 26-HD and 17½-C Rotaries, S3-70 and S5-200 Swivels, No. 510-P Power Pump for pipe lines, No. 46-P, 48P-HD and 344-P Triplex Plunger Pumps, Model A9S "Oilwell"-Lorain Direct-Connected Compressor Unit.

Drilling Equipment Mfg. Company

Booth 27, California Building

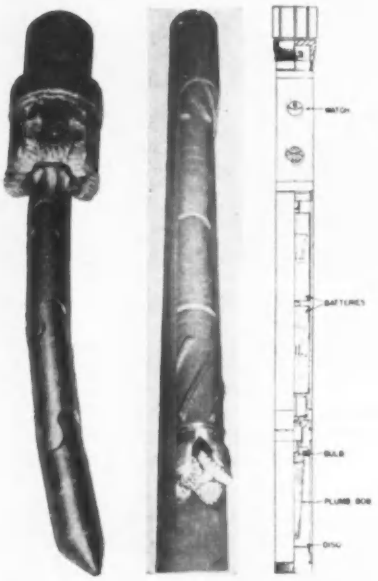
PRODUCTS DISPLAYED:

Combination Casing & Blowout Preventer Tester; "No-Chip" Tong Dies; Rotary Swivel Wash Pipes and Wash Pipe Packing; Pump Brace and Spacers; Choke Nipples; Standpipe Clamps; Hose Hobbles; Hose Adapters; Mud Hoppers; Pump Studs.

Eastman Oil Well Survey Company

Booths 44-59, Scientific and Technical Building

NEW PRODUCTS DISPLAYED:



From left: Hydraulic Actuated Pilot Reamer; Universal Assembly in Whipstock; Small Diameter Single Shot Survey Instrument.

A New Universal Assembly Whipstock features a split lift ring and can accommodate all present drilling assemblies plus a universal drilling assembly which is made up of a universal joint, a reamer and any type drilling bit, and is available in all standard sizes.

Circle No. 41 on Postcard, Page 315

The Hydraulic Actuated Pilot Reamer, more commonly referred to as a flexible rat hole finder, can be used with all types of pilot reamers. A hydraulic jet forces the bottom of the pilot off center to seek the rat hole which in turn guides the reamer into the pilot hole.

Circle No. 42 on Postcard, Page 315

The Drop Type Multiple Shot Surveying Instrument is dropped inside the drill pipe and lands in a non-magnetic drill collar. The survey is run while the drill string is being pulled out of the hole. It is the smallest type of multiple shot surveying instrument, the barrel being 1¾ inches in diameter. A new type of angle unit is used that settles instantaneously and can measure accurately angles from vertical to 90 degrees.

Circle No. 43 on Postcard, Page 315

Eastco Self-Checking Mechanical Drift Indicator has the patented self-checking feature of making two successive recordings. If these readings are not identical, the operator knows that the plumb bob was in motion and that the instrument must be run again. The drift indicator is ten inches long and seven-eighths-inch OD. It does not use batteries or light bulbs but records mechanically on a specially prepared paper disc which is punched by the plumb bob stylus. A second dot is made on the disc after an interval of 40 seconds. The drift indicated should be the same for both punch marks.

Circle No. 44 on Postcard, Page 315

The New Small Diameter Eastman Single Shot Oil Well Surveying Instrument makes a photographic record of the relative positions of a compass card and plumb bob which are contained within the instrument. This photographic record, which is taken at any desired point in the well bore, indicates both the direction of the hole and its deviation from the vertical.

Circle No. 45 on Postcard, Page 315

Eastman's Flexible Drill Collar is designed to attach to any rotary drill stem, is used to drill lateral holes into the producing formation to increase the drainage area, and in preparing a well for acid treatment, repressuring and other conditions where non-porous formations of low permeability are encountered.

Circle No. 46 on Postcard, Page 315

The Eastman Casing Roller is an efficient tool specially designed for the purpose of restoring collapsed casing and liners to their proper sizes and roundness. They are obtainable in sizes for casing ranging from 3½ inches to 17⅜ inches.

Circle No. 47 on Postcard, Page 315

Hoil Engineering Corporation

Block 107

PRODUCTS DISPLAYED:

Hoil's State Treaters for Foreign Export; Crude Oil Emulsion Treaters and Test Units; Hoil Gas-Gard; Hoil "Gage-It"; Equipment for Water Flood Operations; Portable Production Test Units.

Wright Petroleum Laboratories

Booth 23, Scientific and Technical Building

PRODUCTS DISPLAYED:

Typical reports on the following tests: Routine Core Analysis; Special Core Analysis for Obtaining Data for Secondary Recovery Operations; Natural Gas Analysis; Liquefied Petroleum Gas Analysis; Water Analysis; Recombined Surface Samples Analysis on Distillate Wells; Bottom Hole Sample of Reservoir Oil Analysis showing Pressure Volume Relations at Reservoir Temperature; Viscosity of Oil as Gas is Differentially Liberated; Amount of Gas Liberated as Pressure Declines; Volume of Reservoir Oil as Pressure Declines; and Four Separator Tests to Indicate Optimum Operating Pressure.

Westinghouse Electric Corporation

Booths 91-93, 118-120, Oklahoma Building

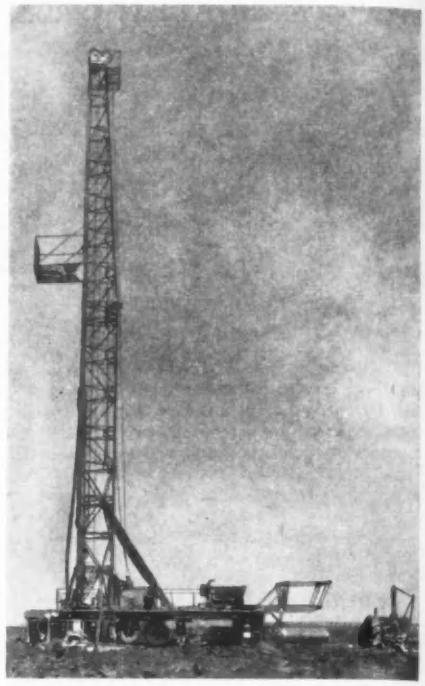
PRODUCTS DISPLAYED:

Visicode-P Supervisory Control; 2000 Megacycle Microwave Equipment; Model Gas Turbines for Pipe Line Pumping; Mockup of an Electrified Oil-Well Pumping Installation; Cutaway of a Speed Increaser; a Line of Motors, one-third to 3000 hp; a Portable Engine-Driven Welder; Other Welding Equipment; Complete Line of Oil-Immersed and Explosion-Proof Controls; Latest Industrial Lighting Equipment.

Mayhew Supply Company, Inc.

Block 117

NEW PRODUCTS DISPLAYED:



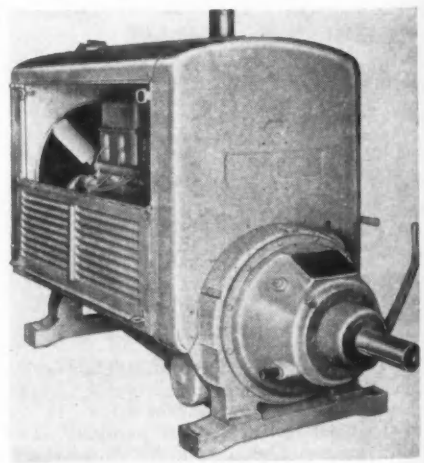
The Mayhew Model 3000 Portable Drilling Rig is designed to drill to 4000 feet with 3½-inch drill pipe, 3000 feet with 4½-inch drill pipe, for 4000-foot drilling or 7000-foot workover. Mounting is on a tandem axle dual wheel semi-trailer. Mast is constructed of seamless steel tubing, 87 feet in height, raised and lowered by means of two triple telescoping hydraulic cylinders. Oil bath rotary table has a 12-inch opening. Three-inch water course oil bath water swivel, and a combination hook block are standard. Three trucks can transport the rig and all necessary equipment. The rig can be set up and drilling started for the surface casing in less than 60 minutes.

Circle No. 48 on Postcard, Page 315

Minneapolis-Moline Company

East of Scientific and Technical Building

NEW PRODUCTS DISPLAYED:

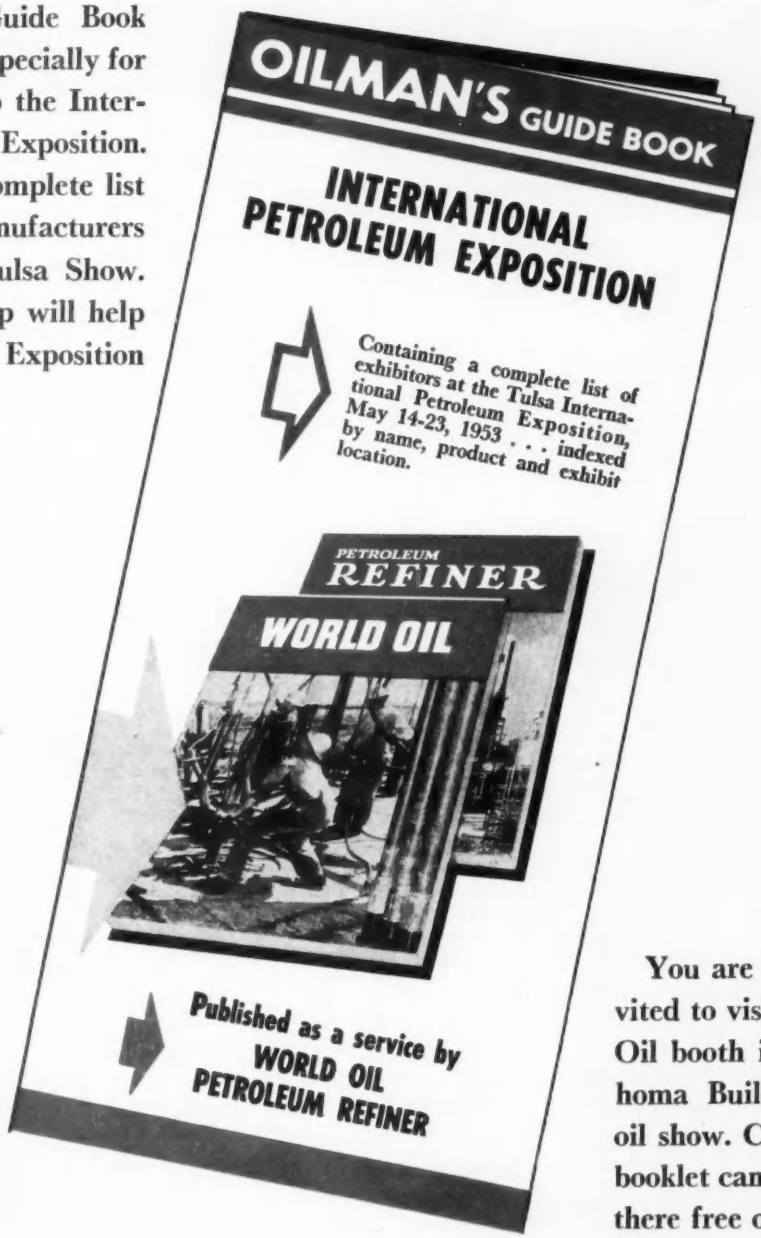


New 800-6A Oilfield Engine, the new 800 cubic inch size unit, will be shown.

Circle No. 49 on Postcard, Page 315

To Help You See the Oil Exposition . . .

This Oilman's Guide Book has been prepared especially for the use of visitors to the International Petroleum Exposition. In it you'll find a complete list of products and manufacturers exhibiting at the Tulsa Show. A large fold-out map will help you get around the Exposition grounds easier.


OILMAN'S GUIDE BOOK
INTERNATIONAL PETROLEUM EXPOSITION
Containing a complete list of exhibitors at the Tulsa International Petroleum Exposition, May 14-23, 1953 . . . indexed by name, product and exhibit location.
PETROLEUM REFINER
WORLD OIL
Published as a service by WORLD OIL PETROLEUM REFINER

You are cordially invited to visit the World Oil booth in the Oklahoma Building at the oil show. Copies of this booklet can be obtained there free of charge.

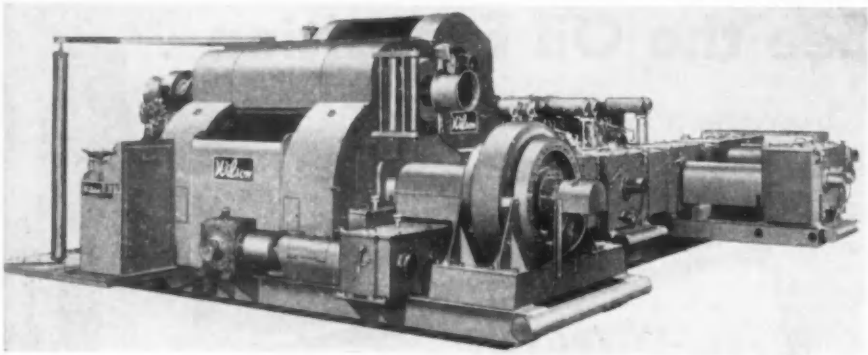
If you want an advance copy of this Oil Man's Guide Book, write to Editor, World Oil, P. O. Box 2608, Houston, Texas.

GULF PUBLISHING COMPANY

World's Largest Oil Industry Publishers

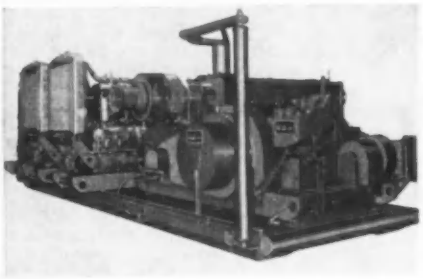
Wilson Manufacturing Company, Inc. Blocks N, R, and 202

NEW PRODUCTS DISPLAYED:



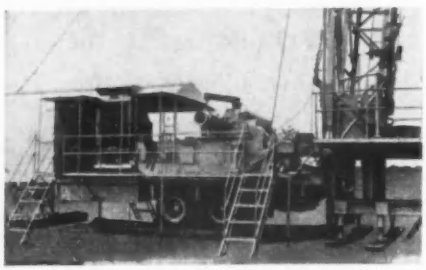
The Wilson Titan Roadair Model Rig contains many new ideas for modern drilling which include remote control panel, dual pump drive and parallel drive, the Wilson plate type compound, Wilson air tube clutches in the drum, and air tube clutches throughout the rig.

Circle No. 50 on Postcard, Page 315



Mogul 42 Roadair Rig is designed to meet the need of those customers who want a rig with compounded engines of up to 400 hp to drill wells to 5000 feet with four-and-one-half-inch pipe. The rig is designed to run without torque converters and at the lowest total cost. Three hundred hp can be used on the pump and about 100 on the rotary table, and all 400 hp available for lifting the pipe. The rig has two friction drum clutch speeds and a two speed transmission in a heavy plate case.

Circle No. 51 on Postcard, Page 315



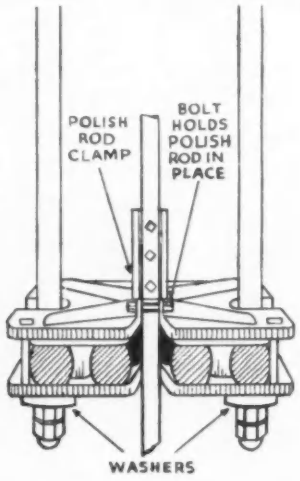
The Wilson Single Engine Giant Rig is mounted on a dual trailer, which divides the rig into two self-supported units, one to carry the drawworks, engine, transmission and tool house, and the other the working floor and mast. With this division of weight, one unit scales 57,000 pounds and the other 60,000 pounds, with relative length of 37 to 40 feet, equipped with built-in trailer hitches, the rig can be moved by simply backing tractors under each half, releasing the jacks and tie-ins and driving off.

Circle No. 52 on Postcard, Page 315

Tulsa Shock Absorber Company

Booth 17, Silver Lane

NEW PRODUCTS DISPLAYED:



The Tulsa Shock Absorber consists of a set of barrel-shaped rubbers held securely between two steel plates. The polish rod type is slipped on the polish rod between the clamp and the hanger. The Pitman beam type is installed on the rear end of the beam. Proper durometer tested rubbers are used on both polish rod types in accordance with the weight of the well. Tulsa Shock Absorbers are available for any weight well of any number of strokes per minute or length of stroke.

Circle No. 53 on Postcard, Page 315

Korkele Production Engineering Company

Booth 39, Silver Lane

NEW PRODUCTS DISPLAYED:

The Reverse Flow Separator is adaptable to all types of pumping wells, high or low pressure. It is effective in wells having high working fluid levels, where there is a "foamy" condition above the pump; in wells that are pumping with low casing pressure; wells that are capable of making heads or flowing through the casing while pumping; and wells producing large amounts of gas through the casing.

Circle No. 54 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Korkele Submerged Oil and Gas Separator; Korkele Adjustable Stroke Control for Oil Wells; Korkele Close Clearance Oil Well Pump.

Royston Laboratories, Inc.

Booth 37N, North Area

NEW PRODUCTS DISPLAYED:

Orco Insulation, a chemical and electrical insulation in sheet form, is being shown as a patching material and for protecting joints of coal tar enameled pipe lines. Furnished in patch form sized to fit welds of mill-wrapped pipe, this insulation is 60 mils in thickness and takes a "jeeping" of 30,000 volts. These pads are sealed to the steel and coal tar by a newly-developed adhesive, Roybond A-99.

Circle No. 55 on Postcard, Page 315

Roylac Aluminum, a resin base aluminum coating, can be sprayed with standard equipment on products or parts, or even wire fencing with the overspray controlled so that objects more than four feet in the background are not marred or damaged by spattering.

Circle No. 56 on Postcard, Page 315

Mud Products, Inc.

Block 115

PRODUCTS DISPLAYED:

MUDCO Steel Mud Tank; MUDCO "O" Ring Butterfly Valves; and a Complete Drilling Mud System in operation.

Fred E. Cooper, Inc.

Blocks A, B, and D

NEW PRODUCTS DISPLAYED:

The T-42-36-DJ Self-Propelled Double Drum Servicing Unit is a new, larger unit for use in the deeper fields. Among the optional equipment is a choice of diesel or gas-gasoline engines, conventional transmission or Allison General Motors torqmatic transmission and torque converter and a choice of positive dental type or air friction drum clutches. Air operated controls are standard equipment.

Circle No. 57 on Postcard, Page 315

The D-50 Single Drum Trailer-Mounted Unit with 85 foot hydraulically raised twin pole mast, is powered by a twin four General Motors diesel with torque converter-torqmatic transmission drive.

Circle No. 58 on Postcard, Page 315

The B125-20" Skid Winch is a small unit for servicing wells to 2000 feet, so compact it can be mounted on a heavy pickup or light truck.

Circle No. 59 on Postcard, Page 315

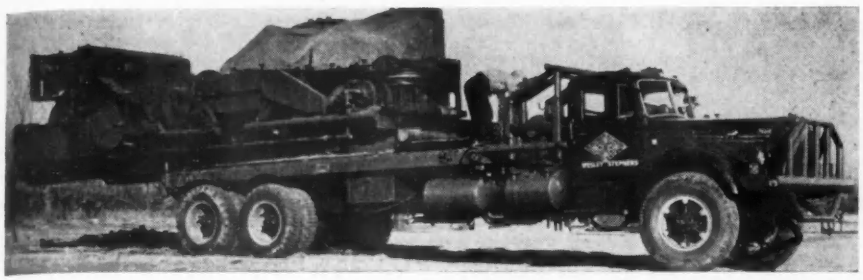
OTHER PRODUCTS DISPLAYED:

Winch Equipment; Twin Pole Telescopic Type Pipe Masts to 87 feet; Derrick Type Masts to 94 feet; Hook Load Capacities to 200,000 pounds.

Mack Motor Truck Corporation

Block 202 North

NEW PRODUCTS DISPLAYED:



Model LMSW-X Heavy-Duty Oil Field Truck is powered by a 196-horsepower Thermodyne gasoline engine of 707 cubic inch displacement. The truck has a 276-inch—54 inch wheelbase and is equipped with power steering, Mack Balanced Bogie and a ten-speed main transmission with three-speed auxiliary box. Its chassis mounts a complete oilfield body with winch and special equipment.

Circle No. 63 on Postcard, Page 315

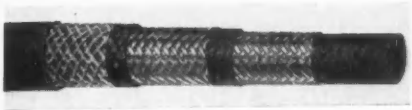
Mack Model B42T Medium Duty Tractor for on and off-highway oil field hauling is a 150 hp Mack with 164½-inch wheelbase, two-speed axle, five-speed direct transmission and 10:00-20 tires.

Circle No. 64 on Postcard, Page 315

Quaker Rubber Corporation, H. K. Porter Co., Inc.

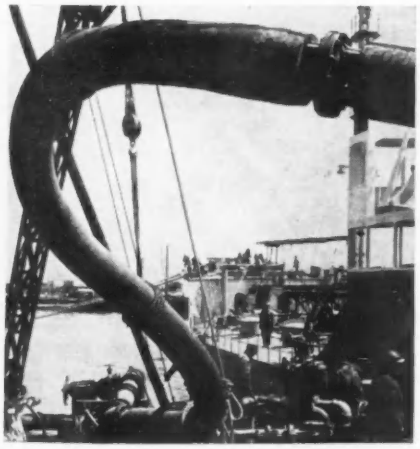
H. K. Porter Company, Inc. Building, Drake Drive

NEW PRODUCTS DISPLAYED:



Quaker Brand Wire-Reinforced Butane-Propane Hose has a minimum burst of 1750 pounds per square inch. Despite its high burst resistance, the hose is said to be easy to handle and fully grounded to eliminate the danger of explosions due to static electricity.

Circle No. 60 on Postcard, Page 315



Qua-Flex Tank Truck Discharge Hose, a horizontal braided type hose, is light, flexible and non-kinking. It is fully static bonded.

Circle No. 61 on Postcard, Page 315

Quaker Dacron Fire Hose for use in the oil industry is constructed with a seamless rubber tube and a jacket of tough durable dacron.

Circle No. 62 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Ebonite Brand Oil Suction and Discharge Hose; Ebonite Brand Oil Suction Hose; and Quaker's complete line of wrapped, moulded, horizontal braided, and Chernak type construction hose for carrying gasoline, oil, liquefied petroleum gases, air, water, steam and welding gases.

Dow Corning Corporation

Booth 19N

NEW PRODUCTS DISPLAYED:

Silicone-Based High Pressure Thread Compound Lubricant was developed for pipe joints in deep wells. Designed to be applicable by brush in cold weather and yet maintain a tight seal against 10,000 pounds per square inch at 300° F., the grease will neither absorb moisture nor dry out and harden due to aging in service.

Circle No. 65 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Water-Repellent Dielectric Compounds; Stable Damping Fluids used in Oil Exploration Geophysical Equipment; Sample Seisphones and Seismometers.

Wedgeplug Valve Company

Booths 47-N and 48-N, North Area

NEW PRODUCTS DISPLAYED:

Wedgeplug Dry Plug Steel Valve has a simple mechanical device which lifts, turns, and reseats the tapered plug tight in the body seats in one operation. The same sequence is automatically followed in either the opening or closing operation. The operation is easy; no lubricants are used and regardless of service, temperature or pressure, the patented cam mechanism assures tight seating. Slurrys, semi-solids in solution are handled as readily as fluids or volatile materials.

Circle No. 66 on Postcard, Page 315

The Fluor Corporation, Ltd.

Booths 46-48, Scientific and Technical Building

PRODUCTS DISPLAYED:

A compressor station model will incorporate all of Fluor's manufactured products: Cooling Towers, Mufflers, Pulsation Dampeners, Fin-Fans, Gas Cleaners.

Worthington Corporation

Block L

NEW PRODUCTS DISPLAYED:

A Seven-Plunger Power Pump Line, mainly used in water flooding and pipe line work, has interchangeable plunger sizes, break-through-flow, individual valve covers, and a completely automatic oiling system.

Circle No. 67 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Three- and Five-Plunger Power Pumps; Centrifugal Pumps; Rotary Pumps; Vertical Turbine Pumps; Refrigeration Compressors; Flare Gas Compressors; and Construction Equipment.

Ingersoll-Rand

Block U

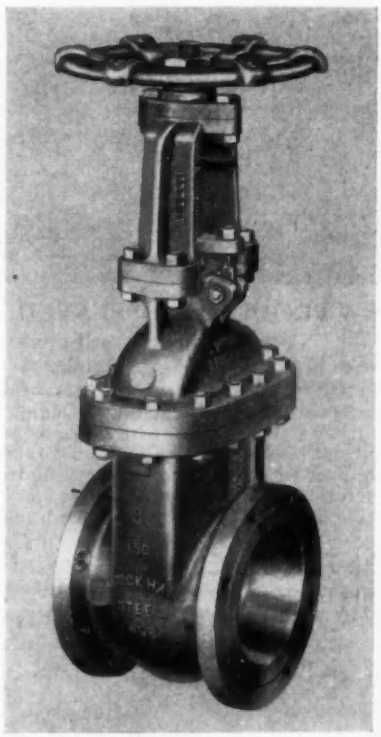
PRODUCTS DISPLAYED:

Compressors; Compressor Valves; Pumps; Air Starting Motors for Gas and Diesel Engines; Air and Electric Tools; Paving Breakers and Rock Drills.

Stockham Valves & Fittings Company

Booths 47-N and 48-N, North Area

NEW PRODUCTS DISPLAYED:



Stockham Steel Gate Valves, 150- and 300-pound, feature straight-through port design which eliminates pockets causing turbulence and reduces frictional losses and erosive damage. For full open-close operation, the valve allows maximum possible flow with minimum pressure loss. Solid I-beam wedge construction of the valve disc provides great strength with maximum resistance to distortion. Extra large handwheel gives ample leverage for easy operations.

Circle No. 68 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

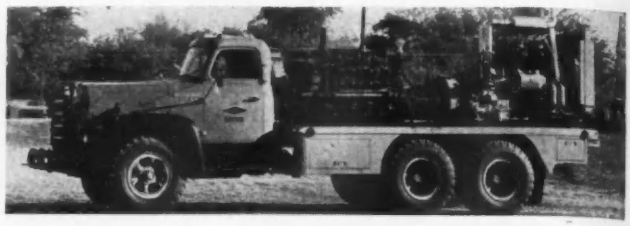
Complete Stockham Line of Bronze and Iron Body Valves; Cast Iron and Malleable Pipe Fittings, Screwed and Flanged.

Dowell Incorporated Block Y

NEW PRODUCTS DISPLAYED:

A New, Light-Weight Mobile Shooting Unit has all the perforating equipment mounted on a two-wheeled trailer which can be pulled to the well by a station wagon. The expendable jet gun is positioned in the well with a one-eighth inch steel armored, single conductor electric cable. Power is supplied to the cable reel from a ten horsepower gasoline engine through a hydraulic torque converter system. The engine also drives the generator that furnishes the current to detonate the jet charges. The total weight of the trailer unit is only 2000 pounds and it is unique for compactness, ease of operation and handling.

Circle No. 69 on Postcard, Page 315



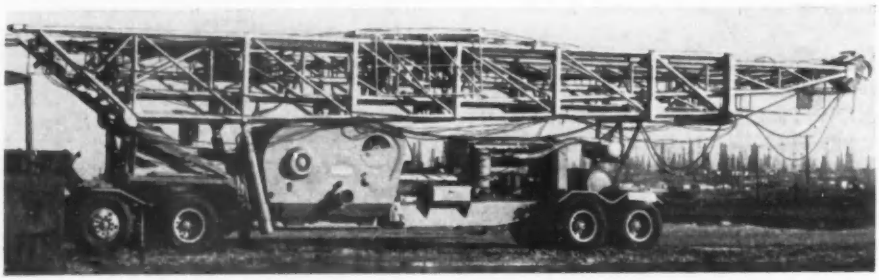
NEW, High Pressure, High Volume Pumping Equipment powered by a 300 hp General Motors Twin Six Diesel, is capable of handling easily the fluid volumes and pressures encountered in all types of well treating. The pump has a 4½-inch bore and an 8-inch stroke, is equipped with a forged steel head, and has a base and crank case of light weight magnesium. This pump will deliver 8½ barrels per minute at 1500 psi. The total weight of the unit is 32,800 pounds with the motor contributing 6300 pounds and the pump 8000 pounds. The magnesium castings used in the pump weigh 1150 pounds.

Circle No. 70 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Fracturing Services including Stratafrac, Sandfrac, and Fixafrac; Acidizing including XM Acid, Channeling Acid, and Etching Acid; Perforating; Electric Pilot Services including Radioactive Fluid Survey, Photoelectric Water Location Survey, Selective Acidizing, Spinner Survey, Caliper Survey, and Permeability Survey; Chemical Cleaning of Tanks; Chemical Cleaning of Refinery Equipment; Plastic Service; and the Products, Corban and New Jelflake.

Franks Manufacturing Corporation Block Z



NEW PRODUCTS DISPLAYED:

The "Clipper" Hoist, a self-propelled highly maneuverable rig, is designed for heavy duty work and has outriggers which provide 18-foot lateral stability, folding to eight feet total width with derrick over road. Other features are hydraulic raising and extending, locking and unlocking from ground, approved safety features on hydraulics, control box with "Airdraulic" brake for feed and feathered control for setting slips, portable controls for vision, derrick raising and extending controls under lock and key for safety when not in work. The Clipper can be registered as a licensed vehicle.

Circle No. 71 on Postcard, Page 315

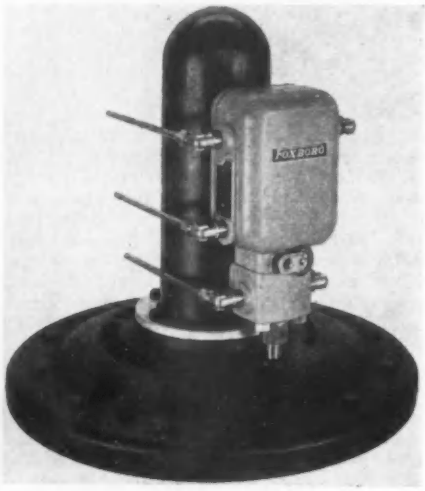
OTHER PRODUCTS DISPLAYED:

Franks Cruisers, Rockets, Comets and Jets for servicing, workover and drilling.

The Foxboro Company

Booths 78N-80N, North Area

NEW PRODUCTS DISPLAYED:



The New Foxboro Consotrol Instruments, including the Model 53 Recorder, the Model 58 Controller and the valve-mounted Model 59 Flow Controller, incorporate the most modern instrumentation for remote measurement and control.

Circle No. 72 on Postcard, Page 315

The Foxboro Capacity Dynalog Instrument affords a new method of measuring interface level between two liquids. Of particular value in handling acids and other dangerous fluids, the instrument employs a capacitance cell to detect the difference in dielectric constant of two liquids or liquid and vapor.

Circle No. 73 on Postcard, Page 315

A Foxboro Poweractor Positioner with a large sized cylinder-operated Stabilflo valve responding to a controller signal, provides fast, powerful and precise control valve action through the pneumatic cylinder.

Circle No. 74 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Pressure Recorder; New Model Flow Meter; Additional Pneumatic and Electronic Instrumentation.

Vickers Incorporated

Booth 104

NEW PRODUCTS DISPLAYED:

The Vickers Hydraulic Pumping Unit is available in 30- and 20-foot pumping stroke models. The units have exclusive features which have resulted in field-proven reductions in maintenance costs and downtime.

Circle No. 75 on Postcard, Page 315

The Vickers Hydraulic Steering System is used extensively on oil field trucks and mobile drilling and servicing rigs.

Circle No. 76 on Postcard, Page 315

Sherman Products, Inc.

Block 207, North Extension

NEW PRODUCTS DISPLAYED:

Bell Hole Type Shovels, a new feature, adapt the Sherman Power Digger specifically to stripping and bell hole work.

Circle No. 77 on Postcard, Page 315

The New Sherman Industrial Trailer is of distinctive new design providing greatly improved resistance to road shock and bed distortion.

Circle No. 78 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Sherman Power Digger mounted on one or more types of rubber-tired tractors.

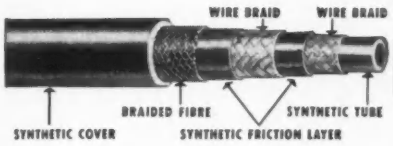
Make Economical "On-the-Spot" Repairs with

WEATHERHEAD

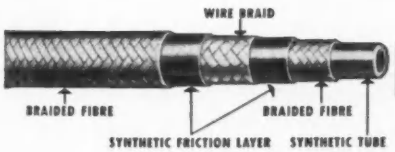
ALL-STEEL REUSABLE HOSE ENDS AND INDUSTRIAL HOSE

When men and machinery are idled by breakdowns in hydraulic lines, you lose time and money. Cut these losses to the bone by stocking Weatherhead All-Steel Reusable Hose Ends and Industrial Hose for "on-the-spot" repairs.

Weatherhead Hose Ends are precision made for fast, easy attachment and for perfect fit that insures leakproof connections. All-steel construction means you can use them again and again under rugged operating conditions. Weatherhead Hose meets every industrial need with a size range from ¼" to 2" I. D. for low, medium, medium-high and high pressure applications.



H-25 High-Pressure Hose, double wire braid reinforcement and tough, non-fraying synthetic cover for trouble-free service.



H-69 Medium High Pressure Hose, wire braid reinforcement; impregnated cotton cover that requires no stripping to attach ends.

plus three other synthetic covered types for low, medium and medium-high pressure uses

WRITE TODAY for Catalog H-1451 with details on hose ends and hose you can stock for "on-the-spot" repairs.
The Weatherhead Company, Dept. B-3, 300 East 131st St., Cleveland 8, Ohio.
In Canada: The Weatherhead Company of Canada, Ltd., St. Thomas, Ontario.

Weatherhead Industrial Warehouse Distributors in all principal cities

ATTENTION OIL SUPPLY HOUSES!

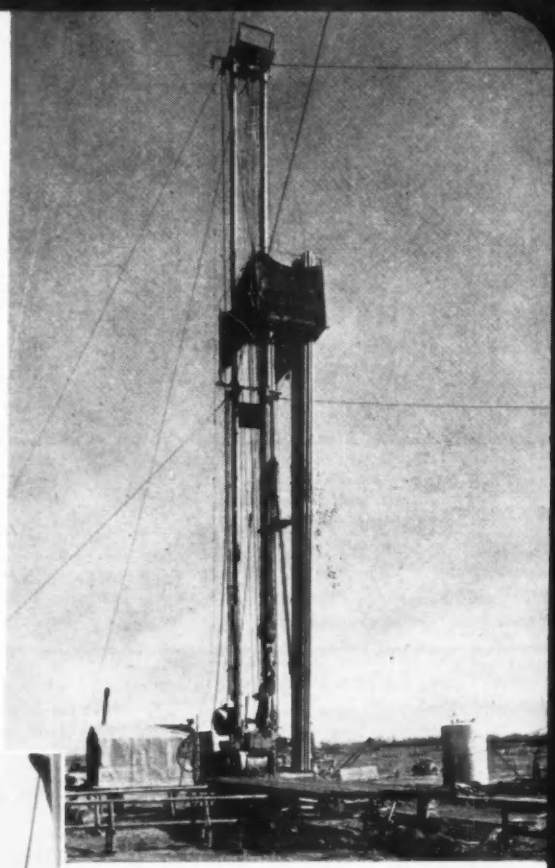
Here's another Weatherhead First! A "Show 'Em and Sell 'Em" unit that you can stock with bulk hose and fittings your customers regularly use. Get details and price data by writing today to Weatherhead Industrial Div., Cleveland 8, Ohio.

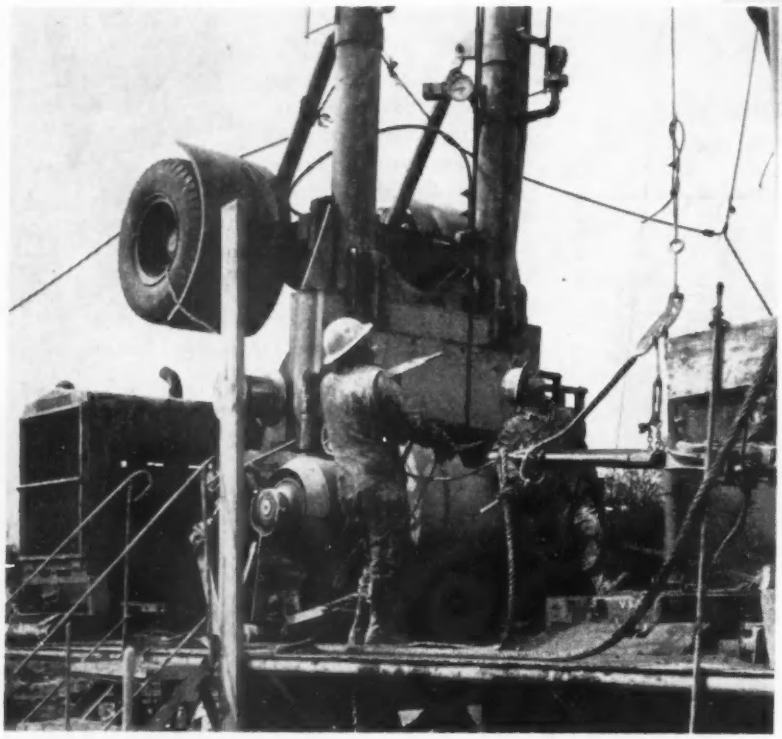
See Our Exhibit
OIL SHOW
TULSA MAY 14-23

The Mark of Quality
WEATHERHEAD
FIRST IN HYDRAULIC CONNECTIONS

1st in EFFICIENCY in PORTABILITY

You profit alike with WICHTEX ROTARY RIGS and with WICHTEX WELL SERVICING UNITS as the result of Wichtex pioneering in simplicity and compactness of design. Wichtex engineering has the single purpose of providing equipment for every depth range that combines improved performance with lighter weight, greater economy and increased portability. Compare—you'll find that your best buy is Wichtex.

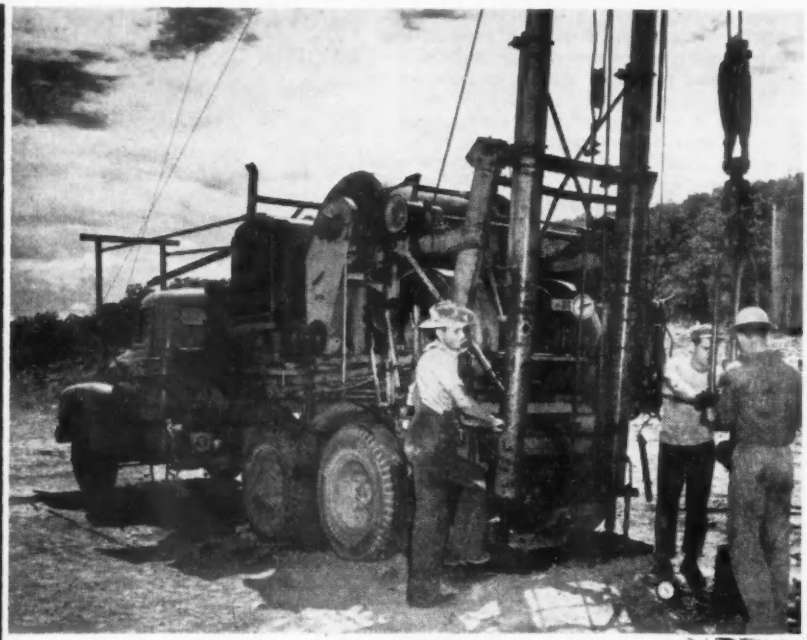




★ WICHTEX

ROTARY RIGS

. . . featuring a completely unitized design that combines increased efficiency of operation with unmatched portability. Available in 4 sizes and 3 types for drilling from 1500 to 5000 feet top to bottom with 4½-inch drill pipe, and for well completion to 12,000 feet. Choice of skid-type or built-in draw works as pictured here.



★ WICHTEX

WELL SERVICING UNITS

. . . preferred for efficiency, dependability, easy operation, and capacity. Wichtex manufactures a complete line of Rod, Tubing and Bailing Machines up to 15,000-foot capacity and Drilling In and Cleanout Machines up to 8,000-foot capacity. See them on display at the Tulsa Oil Show.

SEE OUR DISPLAY at the OIL SHOW

Block 119, West Area

TULSA, MAY 14-21

PORTABLE ROTARY RIGS

ROD, TUBING & BAILING MACHINES • DRILLING IN & CLEAN OUT MACHINES

WICHTEX

WICHITA FALLS, TEXAS

Beech Aircraft Corporation

Booth 123, West Extension

NEW PRODUCTS DISPLAYED:

The 1951 Beechcraft Model D18S Executive Transport is the latest version of the Beechcraft Model 18. The 1953 model has a wide range of changes, including new interior styling, and a wide variety of seating arrangements. Two Pratt and Whitney Wasp Jr. 450-hp engines power it. Performance figures include a maximum speed of 230 mph, cruising speed of 211 mph, rate of climb of 1190 feet for the first minute, service ceiling of 20,500 feet, and a range of more than 1000 miles, which can be supplemented with extra fuel tanks.

Circle No. 79 on Postcard, Page 315

The Model D35 Beechcraft Bonanza is an improved version of the four-place Beechcraft Bonanza. Cruising speed has been increased to 180 mph and top speed is 190. Rate of climb is 1100 feet the first minute, service ceiling is 18,000 feet, and range is 775 miles. Economy is shown by the mileage of 19.9 miles per gallon. The plane comes with standard instrumentation for all instrument flying, and is equipped with the Beechcraft controllable pitch propeller. Most distinctive exterior feature of the all-metal plane is the V-tail which operates with conventional controls, but results in "cleaner" flight characteristics.

Circle No. 80 on Postcard, Page 315

The Beechcraft Model 50 Twin-Bonanza is an entirely new plane designed to be a partner to the Beechcraft Bonanza. The six-place plane has a top speed of more than 200 mph, a cruising speed of more than 190, and a range of 1155 miles. Fuel consumption is 24.8 gallons per hour. First production models came off the production lines in January. Military demands are taking the entire production at present, but civilian orders are expected to be filled within a few months.

Circle No. 81 on Postcard, Page 315

Brown Oil Tools, Inc.

Booths 22 and 23, Silver Lane

NEW PRODUCTS DISPLAYED:

The Duo-Pak, new all-purpose packer, has self-actuating cup type seals above and below the setting, gripping and sealing mechanism, which prevent them from becoming fouled by foreign matter always present in drilling mud. These cup seals provide auxiliary setting force from above or below the packer, requiring very little tubing weight to set the packer and hold the seal. The principal sealing element of the Duo-Pak is radially expansible packing which is not dependent entirely upon tubing weight for compression to effect a reliable seal. The flow of rubber away from sealing engagement is entirely prohibited by metallic retainers at each end of the seal which move into engagement with the casing as the seal expands.

Circle No. 82 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

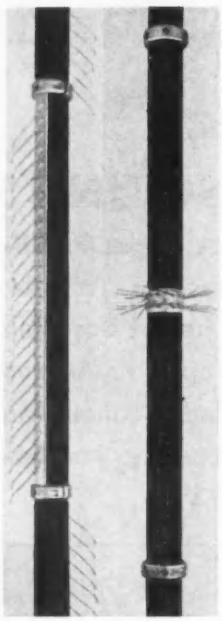
Complete Line of Packers; PS-2 Packer; PS-3 Packer.

B and W Incorporated

Booths 2 and 3, Park Lane

NEW PRODUCTS DISPLAYED:

An open hole plugging assembly permits derrick floor installation of B and W Hinged Nu-Coil Scratchers or B and W Rotating Scratchers on 2⅞-inch tubing, or 3½- and 4½-inch drill pipe, through the usage of B and W Split, Button Type Clamps. Welding on drill pipe which is used for drilling would result in twistoffs. Moving of special plugging assemblies is expensive and causes rig delays. The special B and W Plugging Assembly will cover six 30-foot singles (180 feet) of drill pipe or tubing. Movement of the tubing or drill pipe, during the hole conditioning, cement mixing and cement placement periods will result in a hard cement plug, in close contact with the formation. Such cement plugs are required for plugging off water, side tracking junk, or changing hole direction.



Circle No. 83 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

B and W Latch-On Centralizer with Kon-Kave Bow, B and W Hinged Nu-Coil Scratcher, B and W Multi-Flex Scratcher, B and W Rotating Scratcher, and B and W Gravel Packing Equipment.

Butler Manufacturing Company

Block 116, West Extension

PRODUCTS DISPLAYED:

Butler Steel Building, 28 feet x 36 feet; Semi-Trailer for Transporting Gasoline with the Capacity of 5,700 Gallons; 300-Barrel Bolted Oil Storage Tank; 200 Barrel Bolted Oil Storage Tanks, showing different coating treatments on the interior; Butler Stairs and Walkways; 1000 Gallon Liquefied Petroleum Gas System; Butler Steel Building Pump House.

Bucyrus-Erie Company

Blocks 4 and 201

PRODUCTS DISPLAYED:

Tandem-Axle, Trailer Mounted 48-L Spudder; Tandem-Axle, Trailer Mounted 36-L Spudder; Bucyrus-Erie Hydrocrane; Hydrohoe, a Dragshovel Front-End for the Hydrocrane.

Barco Manufacturing Company

PRODUCTS DISPLAYED:

Swing Joints; Ball Joints; Revolving Joints; Swivel Joints; Swing Joint Repair Parts including Straight Casing, Elbow Casing, Double Casing, Straight Sleeve and Flange, Elbow Sleeve and Flange, Counterweight Sleeve and Flange, "O" Ring Seal, Retaining Ring, and Ball Bearings.

Black, Sivalls & Bryson, Inc.

Booths 39-42, 62-66, California Building

PRODUCTS DISPLAYED:

Entire Line of BS&B Oil and Gas Field Processing Equipment; Low Temperature Separation and Emulsion Treating Equipment; Equipment for Dehydration, Treating, Separating, Heating, and Storage; "Climax" Automatic Controls; Safety Heads; "Climax" Diaphragm Control Valves; Controllers; Regulators. Transportation will be furnished to BS&B's Tulsa plant for a special tour, the attraction being the new hydraulics laboratory.

Bethlehem Supply Company

Block 9

NEW PRODUCTS DISPLAYED:

Bethlehem 1013 Drilling Rig is designed for heavy drilling service. The drawworks section consists of input shaft, catshaft, and drumshaft, all mounted on transverse skids extended for driller's control and auxiliary brake. The drawworks may be easily reduced to an overall width of 8′ 10″ for hauling. When desired, an upper drum assembly can be furnished to replace the catshaft. A heavy duty compound is equipped with a selective transmission having three forward speeds and one reverse speed and is mounted on the No. 1 engine skid. The transmission clutches are gear-spline type and may be equipped with either manual or air controls. Provision has been made to use either high or low speed engines which can be equipped for either mechanical drive or torque converter drive. Fawick disconnect clutches are used between the engines and compound and Bethlehem air friction clutches for the pump drives.

Circle No. 84 on Postcard, Page 315

Bethlehem Model 640D-37S Pumping Unit, built for deep well pumping, has a maximum stroke of 144 inches. In addition to the adjustable crank weights, a

given fixed amount of counterweight to offset the rod load is placed on the beam extension. Thus the variable load is adjusted at the crank and there is considerable reduction of crank and crank balance mass. These beam weights are readily installed with a minimum of effort by a new design special positioning arrangement. Walking beam capacity is 37,100 pounds. The 640D-37S Pumping Unit has a 66-inch 10-C groove maximum sheave and with it a speed of four strokes per minute for deep well pumping can be obtained on a 1200 RPM electric motor drive. A ground lubrication system for lubrication of the tailboard and saddle bearings is standard equipment on the 640D unit. This minimizes the necessity for field personnel to climb on the unit.

Circle No. 85 on Postcard, Page 315

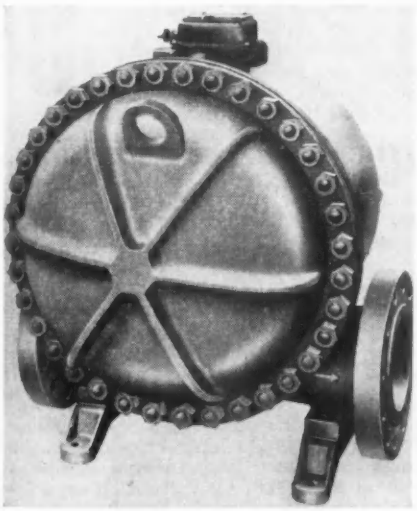
Bethlehem B-30 Traveling Block is particularly adaptable for use on short, narrow, portable masts. The block has an API rating of 60 tons, and can be equipped with either three or four sheaves and grooved for 1- or 1⅛-inch wire line. The 30-inch sheaves are mounted on double tapered roller bearings, which run on an alloy steel center pin. An adapter is not necessary when using a Byron Jackson "460" Hook or a Web Wilson 75-ton Hook or Connector, as these are directly connected to the side plates. This makes a very compact block and hook assembly in that it is very narrow and short. A bail may be furnished, if desired, for connecting to other manufacturers' hooks.

Circle No. 86 on Postcard, Page 315

Ralph N. Brodie Company, Inc.

Booths 54 and 55 California Building

NEW PRODUCTS DISPLAYED:

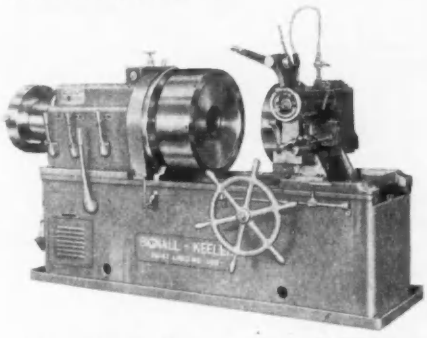


Brodie BiRotor Meters, a complete series for pipe line metering, offer a capacity range of from 170 to 1800 barrels per hour and pressures from 125 to 1000 pounds per square inch. The new series is said to be applicable for crude or refined products on main lines, gathering stations, tank farms, division point control and other installations. Among the features of the meters are vibrationless operation, positive displacement, true rotary operation with static and dynamic balance, dry adjustment, and unit-built assemblies permitting interchangeability without disturbing line connections. Double case construction protects measuring unit from damage caused by line surges, shocks or piping strains.

Circle No. 87 on Postcard, Page 315

Bignall & Keeler Division of John Ramming Machine Company

Booths 12-13, Park Lane



The Bignall & Keeler No. 6B Duplex Pipe Threading and Cutting Off Machine features a fully normalized, heavy-duty, box-type fabricated steel bed with built in coolant reservoir and motor mounting compartment. Motor provides low speed for threading and high speed for cutoff, bevel and ream operations. Selector switch has low, high, reverse and jog positions. Machine is completely Timken Taper Roller Bearing equipped. Gears and bearings have automatic lubrication. All threading dies are made from high speed tool steel heat treated for maximum performance. Reaming and beveling device is supplied with eccentric for locking in operating position. Assembly swings aside to allow pipe a clear passage through machine. Air power Universal front chuck has live grip feature which effectively stops all tendency for pipe to slip when threading and reduces manual labor to an absolute minimum. Built in sizes with maximum capacity for 4-, 6-, 8-, and 14-inch pipe and casing.

Circle No. 88 on Postcard, Page 315

Bovaird Supply Company

Block 1, Drake Drive

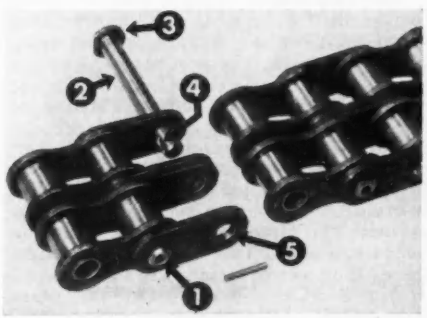
PRODUCTS DISPLAYED:

Shale Shakers; Pumping Units; Mud Pumps.

Baldwin-Duckworth, Division of Chain Belt Company

Booths 99, 100, 111, 112, Texas Building

NEW PRODUCTS DISPLAYED:



The Baldwin-Rex Single Pin Coupler Link, used in the new improved Baldwin Assembly Roller Chain, has one end firmly riveted to the adjacent link (1). The other end contains the unique Baldwin-Rex Coupler Pin (2). One end of this pin is spun over a washer (3). The other end has a milled flat and locking pin hole (4). This pin is an easy fit throughout the chain except for the milled flat end which is press-fitted into the special matching hole (5) of the single pin coupler plate. Thus, it is necessary to drive the pin only the length of its milled flat in assembling or disassembling the chain. Each ten-foot section of chain is boxed individually, and any even pitch length of chain from two pitches up to ten feet can be made from one box of chain. Odd pitch lengths can be obtained by using a three-pitch riveted offset section. Lengths greater than ten feet can readily be obtained by combining additional ten foot sections.

Circle No. 89 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Power Transmission Chains; Self-priming Centrifugal Pumps; Rex API Drilling Chains.

Bettis Rubber Co.

Booth 1, Park Lane

NEW PRODUCTS DISPLAYED:

New Hydraulic Equipment for Installing Protectors on Drill Pipe is readily portable and can be quickly set up anywhere. Bettis hydraulic installation equipment reduces the work of installing drill pipe protectors to a rapid, safe and easy routine. Protectors can be installed while pipe is on the rack, while it is suspended in the derrick, or while going into the hole.

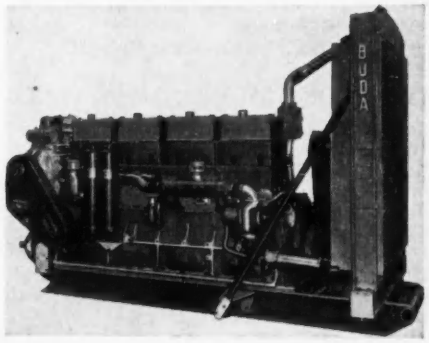
Circle No. 90 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Drill Pipe Protectors; Pipe Wipers; Slush Pump Rod Packing; and Stuffingbox Rod Packing.

The Buda Company

Block M



The New 8 Cylinder, Model 8-MO-3518 Natural Gas Oil Field Power Unit has a bore of eight inches and a stroke of 8¾ inches with a displacement of 3518 cubic inches and develops more than 500 hp maximum and 463 usable hp at 1000 rpm. In the same series, another new unit is the 8-DC-3093 Diesel Oil Field Power Unit with a displacement of 3093 cubic inches, bore of 7½ inches and stroke of 8¾ inches. This will develop more than 420 hp maximum and 380 usable horsepower at 1000 rpm.

Circle No. 91 on Postcard, Page 315

The 4000-Pound Fork Lift Truck is equipped with a four-drum carrier. The unit is ideal for stacking and handling large oil drums and other packaged petroleum products.

Circle No. 92 on Postcard, Page 315

Marine Engines in two sizes ideal for powering offshore boats.

Circle No. 93 on Postcard, Page 315

Truck diesel adapted for powering large oil trucks and tractors.

Circle No. 94 on Postcard, Page 315

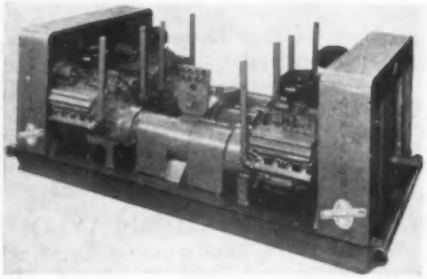
OTHER PRODUCTS DISPLAYED:

Engines Equipped with Torque Converters; Complete Series of 4-, 6-8 and 8-Cylinder Natural Gas, Gasoline Oil Field Power Units; Generator Sets to Light Drilling Rigs.

Chrysler Industrial Engine Division Chrysler Corporation

Block 104

NEW PRODUCTS DISPLAYED:



The Stewart & Stevenson Quad oil field type heavy duty power unit, which utilizes standard industrial Chrysler V-8 basic engines, is designed not only to deliver 500 horsepower, but where fractional loads are encountered, one or more of the four engines may be clutched-out by merely disengaging the friction clutch. If a shutdown should become necessary, complete engines may be replaced one at a time without shutting down the entire power unit, eliminating down-time usually associated with a major engine overhaul. The smoothest of operation is insured because of fluid couplings between each engine and the common power transfer case. As a result engines cannot buck each other and positive synchronization is guaranteed.

Circle No. 95 on Postcard, Page 315

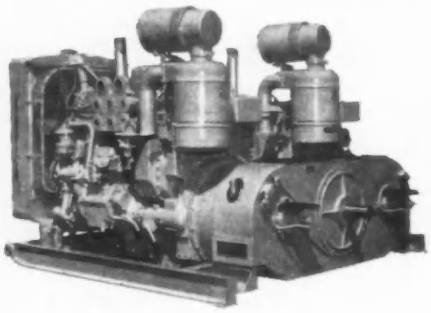
OTHER PRODUCTS DISPLAYED:

IND.20 Cutaway; Open Type Skid Unit; Enclosed Power Skid Unit; IND.8 with four-speed transmission; IND.8 Operating Unit with special clear plastic fluid drive housing unit; IND.15 Open Type Skid Unit; IND.16 Industrial Power Skid Unit; IND.5-A Enclosed Industrial Skid Unit; IND.20 Open Type Skid Unit powering 75 k.w. generator unit; Torque Converter and Fluid Drive Units.

Caterpillar Tractor Co.

Blocks C & E

NEW PRODUCTS DISPLAYED:



The Caterpillar D337 Diesel Engine has continuous output rated at 250 horsepower at 2000 rpm. The six-cylinder, four-cycle diesel has 5⅛-inch bore and 6-inch stroke with a 743 cubic inch piston displacement. The governor provides accurate and rapid response to changing loads. A gear-driven centrifugal pump provides circulation for jacket water in the cooling system. Water temperature is controlled by sensitive regulators which recirculate the water through the cylinder block and head by means of a bypass until operating temperature is reached. Water directors in the cylinder head aim water flow toward exhaust valve seats and precombustion chambers.

Circle No. 96 on Postcard, Page 315

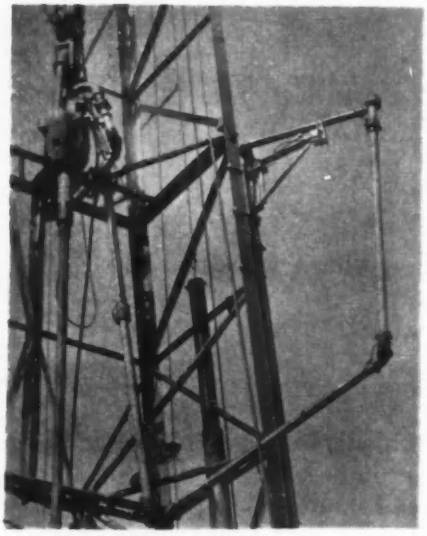
OTHER PRODUCTS DISPLAYED:

Caterpillar Diesel Engines: Models D397 Pipeline Pump Unit; D397 Electric Set; D375 with enclosed clutch; D337 twin with Alamo compound; D326 with enclosed clutch; D318 Electric Set; D13000 Electric Set with crude oil arrangement; D315 with open clutch; D311 Electric Set; D397 cutaway model and D337 with torque converter. Caterpillar Equipment: Caterpillar D8 Tractor with MDW8 Pipe Layer; Caterpillar D7 Tractor with Hyster Hystaway, back hoe and Fleco rock rake; Caterpillar D4 Tractor with PD4 pipe layer arrangement and angle filler; Caterpillar No. 6 Shovel with D6N worm drive winch, and Unimatic Detachable Ditcher (pilot model), mounted on a Caterpillar D4 Tractor.

Chiksan Company

Booths 101-103, 108-110

NEW PRODUCTS DISPLAYED:



The Chiksan Hose Saver Arm, designed specifically for portable rigs, is bracketed to the mast leg and extends out and away from the derrick. The arm holds the rotary hose outside the derrick enclosure during most of its travel, preventing rubbing of the hose against the mast leg and keeping the derrick floor clear of hose. The arm increases the radius of bend of the hose, preventing damage due to kinking or twisting. A companion piece designed for use with the Hose Saver Arm is a drilling swivel extension. This unit is bracketed to the drilling swivel to increase stability and provide additional flexibility for the rotary hose system. The complete assembly provides uniform strength and safety and speeds hose handling.

Circle No. 97 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Chiksan Ball-Bearing Swivel Joints; All Steel Rotary Hose; Circulating and Cementing Hose; Circulating Heads; Mud Guns.

Fluid Packed Pump Company

Booths 1 and 2, California Building

NEW PRODUCTS DISPLAYED:

The Oilmaster Volume Producer Pump is a full-barrel rod type, all metal plunger pump designed to provide the largest practical cross-sectional area for use in a given size tubing. Volume producer assemblies are most widely used in wells ranging in depth from 500 to 5000 feet. However, excellent results have been obtained at great depths when fluid levels were high and pumping conditions not too severe. Outstanding features of this pump include one piece alloy steel hardened and honed barrel tubes, stainless steel precision fitted seats and balls, reversible one-piece, pin-both ends, chrome plated grooved plungers, heavy cages and heat treated machined parts.

Circle No. 98 on Postcard, Page 315

The Oilmaster Rod Weight Compensator is a hydraulic counter-balance located below the mid-point of the rod string. By counterbalancing the weight of the lower part of the rod string, the compensator reduces the stress in all of the sucker rods located above it. The lifting force is applied to the rod string by the compensator piston. The high pressure of the fluid in the tubing acts on the bottom of this piston. The low pressure gas from the casing acts on the top of this piston. This difference in pressure across the piston causes a lifting force which reduces the weight on the upper part of the rod string.

Circle No. 99 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Fluid Packed Pumps; Volume Producer Pumps; Petrol "A" Pumps; Improved Insert Pumps; Tubing Full Liner Pumps; Producer Pumps; Unit Barrel Pumps.

Eutectic Welding Alloys Corporation

Booths 42 and 43, Silver Lane

NEW PRODUCTS DISPLAYED:

Eutectic's Patented "Low Temperature" EutecRods with their companion Eutector Temperature Indicating Fluxes will join aluminum, magnesium, titanium, steel, cast iron at heats far below the melting point of these metals.

Circle No. 100 on Postcard, Page 315

The New ChamferTrode will vee and groove metal at great speed.

Circle No. 101 on Postcard, Page 315

Eutec-Tin Weld, a paste which combines solder and flux in the correct proportions, will help in many soldering and tinning problems.

Circle No. 102 on Postcard, Page 315

Cutrode, the metal piercing electrode, will cut, pierce, and remove unwanted metal with speed, ease and precision.

Circle No. 103 on Postcard, Page 315

The DynArc Process, a new development in piercing refractory materials, will pierce rock, concrete, granite, firebrick.

Circle No. 104 on Postcard, Page 315

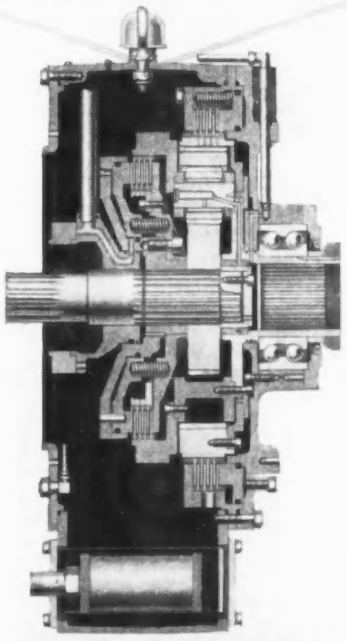
leads in the development and HYDRAULIC Drives!

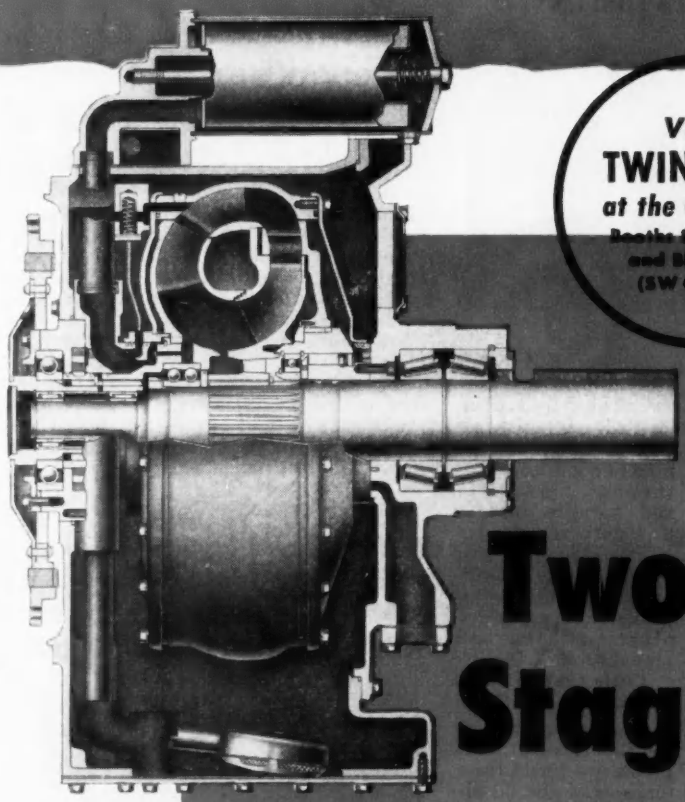
2-speed Transmission

(MODEL T-302)

Extends Full-Range Performance of your Torque Converters

Oil-actuated for smooth, positive action—the new Twin Disc Model T-302 is engineered to permit three-stage torque converters to deliver *extended performance within their maximum operating range.* Engineered for quick, easy installation. Ratio spread is available in 2.69:1 or 3.07:1. Write to Hydraulic Division, Rockford, for complete information.





Visit
TWIN-DISC
at the Oil Show
Booths 81-N, 82-N and Block 207 (SW Corner)

Two-Stage Torque Converter

offering new converter performance characteristics to fill the gap in industrial hydraulic drives

- **Up to 4:1 Torque Multiplication at Stall**—Delivers greater performance from present engines. *Eliminates* engine-lugging and torsional variations; *reduces* gear-shifting and clutching, *decreases* operator fatigue.

- **Operating Economy With Minimum Cooling Requirements**—accomplished through exclusive free-wheeling guide stage, allowing the engine to be completely unloaded under high speed, no-load conditions.

- **Progressive Increase of Engine Speed, and Uniform Pull-Down Under Load**—engine rpm during acceleration progresses *evenly;* decrease of engine rpm during load increase is *uniform.*

For specific information on new Twin Disc Two-Stage Torque Converters, write to Hydraulic Division, Rockford, Illinois.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U. S. PAT. OFF.

TWIN DISC CLUTCH COMPANY • RACINE, WISCONSIN
Hydraulic Division, Rockford, Illinois

Link-Belt Company

Booths 61, 62, 63, Texas Building

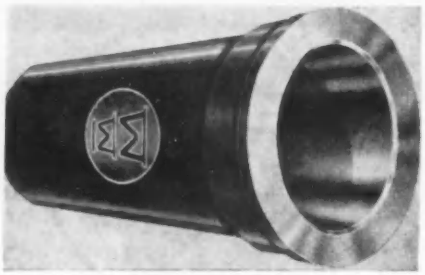
PRODUCTS DISPLAYED:

NRM 124, 2 x 4-foot, Shale Shaker; Precision Steel Roller Chains; A.P.I. Roller Drive Chains; Unmounted Radial-Thrust Bearings; Self-Aligning Roller Bearing Pillow Blocks; Vibrating Screens; Chains; Bearings.

Mission Manufacturing Company

Booths 91-93, 118-120, Texas Building

NEW PRODUCTS DISPLAYED:



Super-Service Liner

E-Z Swab

Mission E-Z Swab lessens chances of line breakage by automatically bypassing fluid overloads and passing smoothly through tight spots and paraffin bridges to reduce the danger of sticking. Flexible fins of the E-Z Swab rubbers minimize damage to expensive plastic-coated and plated tubing.

Circle No. 105 on Postcard, Page 315

Mission Super-Service Liners with Satin Finish are made from forgings of special alloy steel developed through laboratory research. Careful metallurgical control insures inclusion-free high quality steel, providing a tough, long lasting liner. The bores, accurately honed to smoothness by specially designed new equipment, are uniformly hardened by the electrical induction method and have a deep file-hard case.

Circle No. 106 on Postcard, Page 315

Mission Self-Sealing Gland Packings are made of a special compound. Both the packing and the ring are split to allow installation or removal from the pump stuffing box without unscrewing the rod from the cross head or removing the rod from the pump. The split packing functions as one piece, assuring perfect lip sealing. Pump pressure automatically tightens the packings, making frequent tightening of gland nuts unnecessary.

Circle No. 107 on Postcard, Page 315

Slush Pump Upper Valve Springs assure smooth pump operation. Properly designed valve spring reduce pump knocking, excessive surges and rough pump operation.

Circle No. 108 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Silver Top Valves; Super-Service Valves; Fluid End Pistons; Super-Surfaced Piston Rods; File-Hard Piston Rods; Rolling Dog Slips; Centrifugal Pumps; Automatic Lubricated Plug Valve.

Lufkin Foundry & Machine Works

Block 3

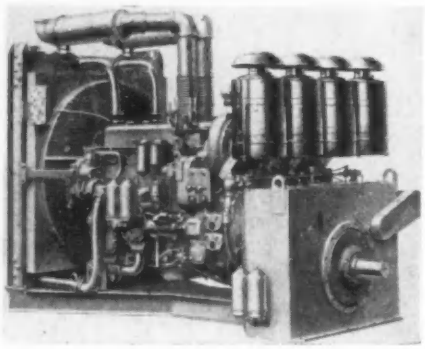
PRODUCTS DISPLAYED:

Lufkin TC-OL-61B Twin Crank Pumping Units; Lufkin TC-2A-36B Twin Crank Pumping Unit; Lufkin TC-33A-18B Twin Crank Pumping Unit; Lufkin TC-44-15B Twin Crank Pumping Unit; Lufkin T6D-9B and Lufkin T7-3B Twin Crank Pumping Units; Lufkin ABS-320-27 Air Balance Pumping Unit; Lufkin #3520 Long Stroke Hydraulic Pumping Unit; Lufkin 1/16-inch Model Pumping Unit and Derrick in operation; Cutaway Gear Box illustrating lubricating system of the Lufkin Pumping Unit Gears; Lufkin H-333 Engine Cutaway with plastic covers illustrating workings of every component of the engine mechanism; Lufkin N-126 Speed Increaser; Lufkin #125 Winch cutaway to show details of operating components.

Detroit Diesel Engine Division General Motors Corporation

Block 10

NEW PRODUCTS DISPLAYED:



The New Twin 6-110 Diesel Engine produces 392 continuous hp at 1600 rpm and has a maximum intermittent rating of 500 bhp at 1800 rpm. Both engines in the unit are provided with dumping type torque converters between the engine and the compound. Compounding of the two engines is accomplished with a high velocity chain drive instead of gears.

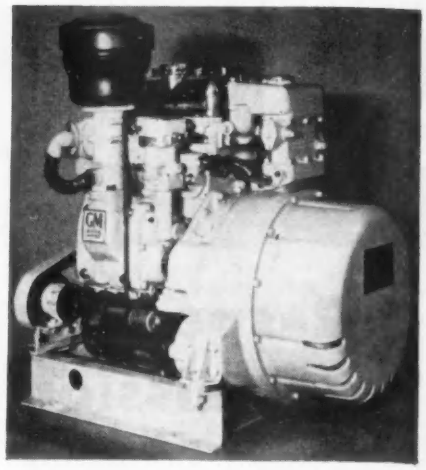
Circle No. 109 on Postcard, Page 315

A New Valveless Marine Engine, the 4-51, is only 31 inches high and with direct drive is only 49¼ inches long. This is a relatively high speed four-cylinder marine diesel with both intake and exhaust ports in the replaceable cylinder liners replacing the usual intake and exhaust valves and valving mechanisms.

Circle No. 110 on Postcard, Page 315

A New Inclined Light-Weight Model of the 138 SHP 4-71 Two-Cycle Diesel is 9½ inches less in depth than the upright 4-71, due to inclining the head and block 70 degrees from the vertical. Due to extensive use of aluminum alloys in its manufacture, it is 500 pounds lighter than the standard 4-71.

Circle No. 111 on Postcard, Page 315



A New 12½ kw Permanent Magnet Generator Set has the field and armature mounted directly on the engine flywheel and flywheel housing and has no commutator or slip rings and no bearings. It is very compact, being only 37⅜" long and 37¾" high.

Circle No. 112 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Single 6-110; Twin 6-71; and Quad 6-71.

The Torrington Company Bantam Bearings Division

Booths 177-178, Oklahoma Building

PRODUCTS DISPLAYED:

Conical Roller Thrust Bearings; Self-Aligning Spherical Roller Bearings; Radial Roller Bearings; Single Row Tapered Roller Bearings; Drum Shafts; Drawworks; Crown Blocks; Traveling Blocks; Line Shafts; Cathead Shafts; Slush Pumps; Heavy-Duty Needle Bearings.

Raybestos-Manhattan, Inc.

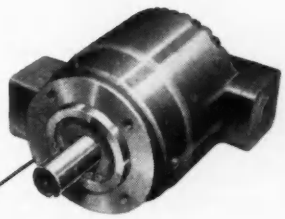
Booth 15-16, Scientific and Technical Building

NEW PRODUCTS DISPLAYED:

Ray-Man CBL Rotary Hose, built with a cable wire strength member, is highly flexible and withstands crushing caused by kinking or by being run over accidentally. Rated at 5000 pounds working pressure with a high factor of safety, the hose has new "Lip-Lok" built-in coupling with leak-proof seal. The hose holds steady in the derrick, resists pulsation under pressure, and handles easier when moving from one location to another with less danger of damage.

Circle No. 113 on Postcard, Page 315

R/M "Vee-Square" Packing Rings are available for all sizes and makes of mud

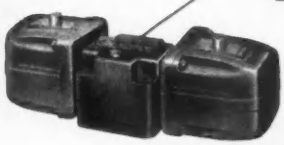


See Our Exhibit

OIL SHOW

TULSA MAY 14-23

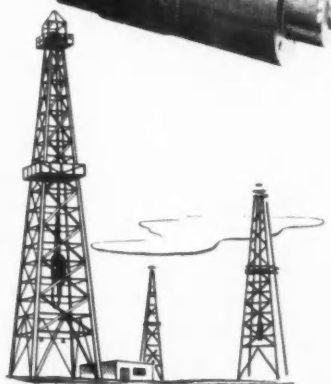
Booths 29N–30N



DENISON HydrOILic EQUIPMENT

meets the toughest oil-field needs for

RUGGED DEPENDABILITY



"The Finest Money Can Buy!"

For more than 25 years, Denison has met Industry's toughest demands for oil-hydraulic equipment – *with the kind of rugged, efficient, high-pressure components that are now winning such wide approval in oil-field operations.*

To meet constantly increasing needs, Denison now offers *today's most rapidly expanding line* of equipment for packaged hydraulic power, hydraulic transmissions, remotely controlled equipment, and other needs for widely adjustable power, speed, and control.

Wherever you need variable speed drives, accurate pressure control, spark-free power transmission, or closely controlled hydraulic motion of any kind, let Denison's HydrOILic Equipment give you the answer.

Write for details, or call your nearest Denison representative.

DENISON HydrOILics

The DENISON Engineering Company

Factory and Home Offices: 1204 Dublin Road, Columbus 16, Ohio

WEST COAST BRANCH
565 N. Prairie St., Hawthorne, Calif.
Telephone: Osborne 5-3230

CHICAGO BRANCH
4306 W. 63rd St., Chicago 29, Ill.
Telephone: Reliance 5-7474

HOUSTON BRANCH
1200 Bissonet, Houston 5, Texas
Telephone: Justin 6232

slush pumps. Soft rubber cushions between the rings prevent "blow-by" and insure perfect fit with proper sealing pressure against the rod. The solid portion of the packing is square and absorbs gland pressure without transferring unneeded pressure to the rod. This also prevents packing from rolling and riding the rod. The V-design provides automatic sealing against the rod.

Circle No. 114 on Postcard, Page 315

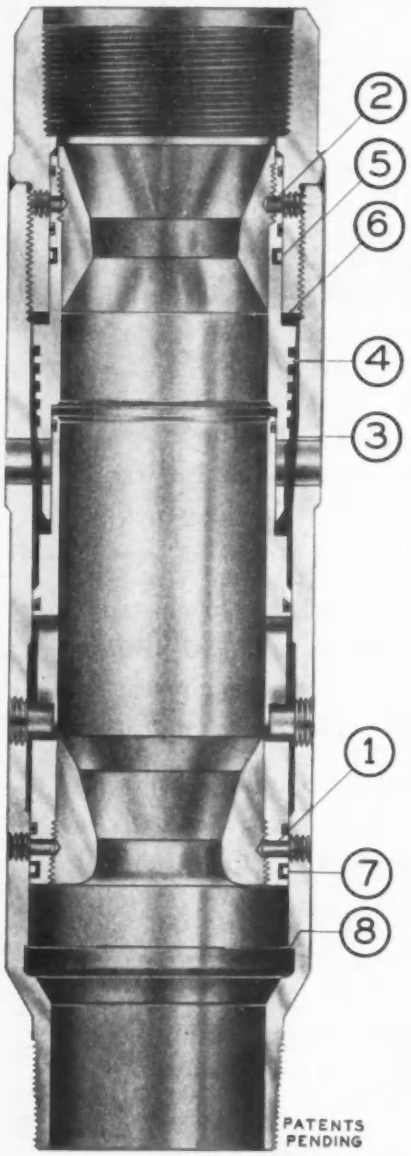
OTHER PRODUCTS DISPLAYED:

V-Belts; Oil, Air, Water, Steam and Fire Hose; Brake Blocks for Rotary Drawworks; Packings and Gaskets.

Rector Well Equipment Company, Inc.

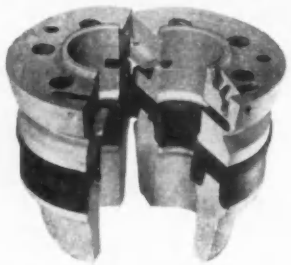
Booths 19, 20, and 21, Oklahoma Building

NEW PRODUCTS DISPLAYED:



Rector Type "T" Two Plug Stage Cementer is designed to pass all equipment to complete lower cement job. All internal steel parts are full opening and internal aluminum parts drillable. With tool set at a predetermined point in the casing string, lower cement job completed, an aluminum trip ball gravitates to seat in tapered surface of lower baffle. Pressure of 600 pounds per square inch shears pins (1) tripping the lower steel sleeve, opening four 1½-inch diameter ports. The steel snap ring (7) snaps under shoulder (8) to prevent upward movement. Rubber wiper plug is inducted ahead of slurry and top rubber plug inducted behind slurry, seating in upper aluminum baffle, shearing pins (2) at 600 psi tripping upper steel sleeve and closing ports. Steel to steel closure is accomplished as the three degree tapered surface (4) wedges into the three degree tapered surface (3). Steel snap ring (5) snaps under the shoulder (6), a safety feature preventing movement of the upper steel sleeve.

Circle No. 115 on Postcard, Page 315



Rectorhead Tubing Head Type "WM" Wrap Around Mandrel is made to use with tubing heads when the tubing is suspended from threads in the underside of the tubing head bonnet. It consists of bottom split ring, top split ring and neoprene element. The top ring is grooved to be held in place by locking screws. The neoprene element is V-shaped downward. It is cut on one side and partially on the other to act as a hinge and when closed the top ring latches in place.

Circle No. 116 on Postcard, Page 315

Type "SP" Combination Slip-Packoff Assembly for "RH" Casingheads is a dual purpose unit consisting of a four-segment hinged type set of slips to suspend casing and resilient packing attached above to effect a temporary seal. The design of this assembly is such that the entire unit may be wrapped around the casing, latched and dropped through the blowout equipment. As the unit settles into the casing headbowl, the slips set and the packing above is automatically compressed to form a positive seal for pressures from below or from above when using as a weld test packoff. This automatic sealing arrangement eliminates the necessity of tightening the Allen screw by hand to compress the packing and effect a seal. After slips are set, the single welding ring is installed above the assembly in the usual manner.

Circle No. 117 on Postcard, Page 315

The Rector Ram "PV" Plug Valve is an adaptation of the Rector Round Ram Tubing Head. It is used for drilling gas wells and remains on the well as a part of the production equipment. One end is blank and the other operates a special round ram body with a non-rising screw. A regular ram body is used; the new part consists of the special blanking end, a new type four-piece ram shut-off and special housing for the non-rising screw.

Circle No. 118 on Postcard, Page 315

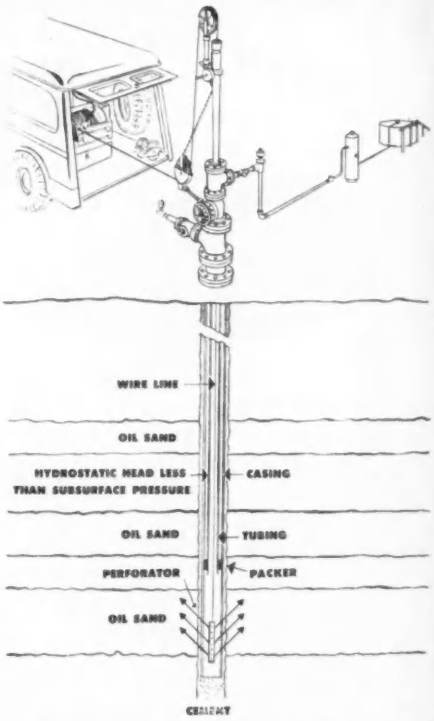
OTHER PRODUCTS DISPLAYED:

"RH" Casing Head and Tubing Head; "A" Type Mandrel; "C" Type Mandrel; "M" Stripper for Type "M" Head; Type "R" Casing Head and Adapter; Type "R" Tubing Head with Adapters (Male, Flanged and Welded); Type "RC" Combination Tubing Head; Type "RM" Mandrel Type Tubing Head; Type "R-K" Thread Kobe Tubing Head; Type "R-KS" Slip Kobe Tubing Head; Multi-Duty and Spool; Type "F" Hanger Flange; Kobe Flanges, threaded and slip type; Ram Head "CRS" No. 2900 Series; Type "M" Double Welding Mandrel Casing Head, also thdd. Mandrel; Rector Christmas Tree Assembly; Cementing Head with Floating Equipment, cutaway; Rectorseal.

Schlumberger Well Surveying Corporation

Block 105

NEW PRODUCTS DISPLAYED:



The New Expendable Shaped Charge Gun for perforating casing below the tubing is designed to pass through tubing with a minimum of two inches inside diameter. The body of the gun is a tubular carrier of soft metal which is shattered by the explosion, the pieces dropping harmlessly to the bottom of the hole. The charges are linked in a chain within the carrier with a spacing of five per foot.

Circle No. 119 on Postcard, Page 315

The MicroLog Continuous Dipmeter is an improved instrument with which the information used for the determination of the dip is obtained by three MicroLog

See you at the Oil Show!

Here's where we welcomed Oil Show visitors in '48. Same spot this year—but with the latest developments in oil-field machinery plus new and more interesting exhibits.

TULSA, OKLAHOMA • MAY 14-23, 1953

The latchstring's out, and we're ready for your visit to the Bethlehem exhibit at the Oil Show. Plan on being there, won't you? Our people are a mighty friendly group, and they will do everything possible to make your stay a pleasant one.

You'll find the Bethlehem building right in the heart of the show grounds—same location we had in '48. The present exhibit is brand-new, colorful, and modern as today. You'll see in action the latest drilling equipment and pumping units . . . and fine displays of wire rope, sucker rods, fastenings, pipe, and forgings. There will also be a section devoted to drilling barges and other types of oil-country vessels. We hope you'll take your time, enjoy it all, and ask a million questions.

Representatives of Bethlehem Steel Export Corporation, with its world-wide coverage, will be on hand to assist all foreign visitors.

Remember, it's a date. Look us up as soon as you reach the show!

BETHLEHEM STEEL

BETHLEHEM SUPPLY COMPANY

General Offices: 21 E. Second St., Tulsa, Okla.
West Coast Headquarters: Los Angeles, Calif.
Export Distributor: Bethlehem Steel Export Corporation
25 Broadway, New York, N. Y.
Canadian Representative: Rocky Mountain Supply Co., Ltd.
Calgary, Alberta

curves. These three curves, as well as the orientation of the instrument and the inclination of the bore hole, are simultaneously and continuously recorded over the entire bore hole. This continuous recording has the advantage of giving a very great number of intervals where the dip can be determined. Recorded simultaneously with the dipmeter is a continuous record of the angle and azimuth of the drift of the bore hole.

Circle No. 120 on Postcard, Page 315

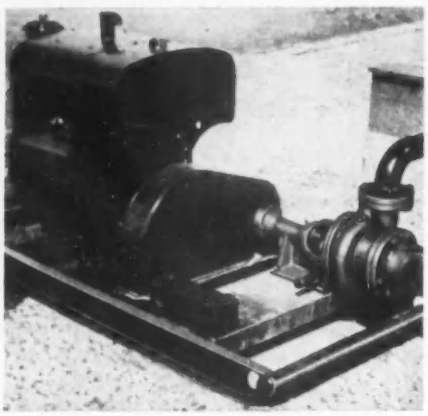
OTHER PRODUCTS DISPLAYED:

Complete Multiple Service Unit capable of performing any of the 25 electrical oil well services and including the panels that control the equipment run in the bore hole, galvanometer recorders, complete dark room field printing machine for duplicate records, winch and cable for lowering instruments in the well.

Harley Sales Company, Wisconsin Motor Corporation

Harley Sales Company Building, Block 4

NEW PRODUCTS DISPLAYED:



Ampco Centrifugal Pumping Units powered by Wisconsin Air-Cooled Heavy Duty Engines with Ampco metal construction are ideal for handling oil field brines and sour crude. This Wisconsin model VF4D (20 horsepower) oil field power unit operates the pedestal-type Ampco centrifugal pump that has a capacity of 525 gallons per minute at 60 feet head and 100 gpm at 220 feet head.

Circle No. 121 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Roper, Goulds, Blackmer, Worthington, Gardner-Denver, Peerless, Ampco, and Deming Pumps; Electric Lighting Plants; and Compressor Installations.

Mid-State Chemical Company, Inc.

Booth 6, California Building

NEW PRODUCTS DISPLAYED:

Sol-Treet Paraffin Solvent for use on pumping wells, flowing wells, for lead lines and BS and paraffin in tank bottoms is safe and economical. The product dissolves the paraffin faster and retains the dissolved paraffin in solution. Sol-Treet has low flammable properties and is safe to handle and stock in warehouses.

Circle No. 122 on Postcard, Page 315

Gypestone Water Treet is a group of phosphates with other chemicals added converted from liquid form to a solidification. This product is for use in oil wells to eliminate hydrogen sulfide, calcium sulfate, iron sulfide, manganese and other corrosive elements causing pitting and eating of the metals in oil wells.

Circle No. 123 on Postcard, Page 315

Derusto prevents rust and eliminates the use of primers over rusty surfaces. It is available in aluminum, white and many oil field adapted colors.

Circle No. 124 on Postcard, Page 315

Brite Tank Aluminum Paint does not peel, flake or discolor tanks, boilers, stack breechings or other interior metal surfaces or exterior surfaces reaching temperatures of 800 degrees Fahrenheit.

Circle No. 125 on Postcard, Page 315

"RAP" (Removes All Paints) is a wash-off paint and varnish remover used on drilling rigs, pumping units and oil field installations to remove undesirable paints. It can be brushed on, sprayed on or dipped. After a few hours, undesired paint can be washed off.

Circle No. 126 on Postcard, Page 315

Mid-State Chemical Company's complete line of oil field and industrial enamels to be used on all oil field machinery and equipment are also recommended for use on metal, wood, concrete, and masonry surfaces.

Circle No. 127 on Postcard, Page 315

Roustabouts and Roughnecks Mak-Lik Hand Cleaner is especially medicated non-ammoniated and will clean hands without water.

Circle No. 128 on Postcard, Page 315

"RAP" (Removes All Paints) Paint Brush Cleaner is guaranteed to clean the hardest paint brush in a short time and will not harm bristles or pure nylon.

Circle No. 129 on Postcard, Page 315

Larkin and Company, Inc.

Booth 43 N, North Area

NEW PRODUCTS DISPLAYED:

Ratchet Type Pressure Packer has been developed with a ratchet type head and enclosed slip lugs. A stronger, heavier body is employed under a thick rubber for high pressure work.

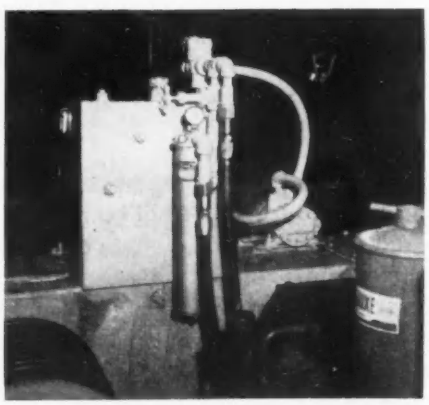
Circle No. 130 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Packers designed for secondary recovery and packers for primary production.

Fluid Power Corporation

Block 207

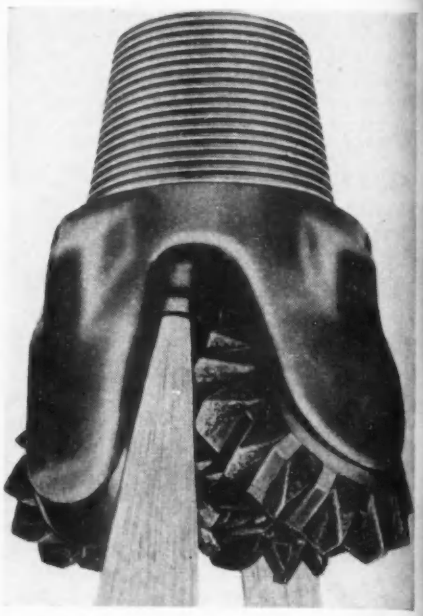


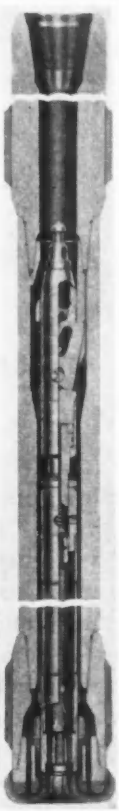
The Hydraulic Power Transmission eliminates clutches, shafts, bearings and gears in transmitting power from one source to another. Being explosion-proof, weather-proof and self-lubricating offers many advantages. Applications include drilling rig auxiliary drives, among them shale shakers, water pumps, measuring lines, rotary tables, automatic driller, mud mixers. Horsepower applications are from 5 to 300, with speed ranges from 100 to 4500 rpm.

Circle No. 131 on Postcard, Page 315

Reed Roller Bit Company

NEW PRODUCTS DISPLAYED:





Reed Twin-Blast Rock Bits are fast drilling, long wearing bits because of the slush nozzle, which is the heart of the Reed Twin-Blast Rock Bit. Slush from this nozzle blasts cuttings from the bottom of the hole before they can be recut, allowing the bit cutters to operate at full efficiency. The result is larger cuttings, faster drilling, more footage per bit, and more hole per day.

Circle No. 132 on Postcard, Page 315

Reed Diamond Head Wire Line Core Barrel greatly reduces coring costs because it eliminates round trips to recover cores. The core barrel has greater strength and a special drill collar is used for the outer barrel. Large area slush openings in the diamond bit permit circulation of a greater amount of slush to remove the cuttings from the bottom of the hole. In some areas and formations the Reed Diamond Head Wire Line Core Drill will often penetrate faster and stay in the hole longer than rock bits.

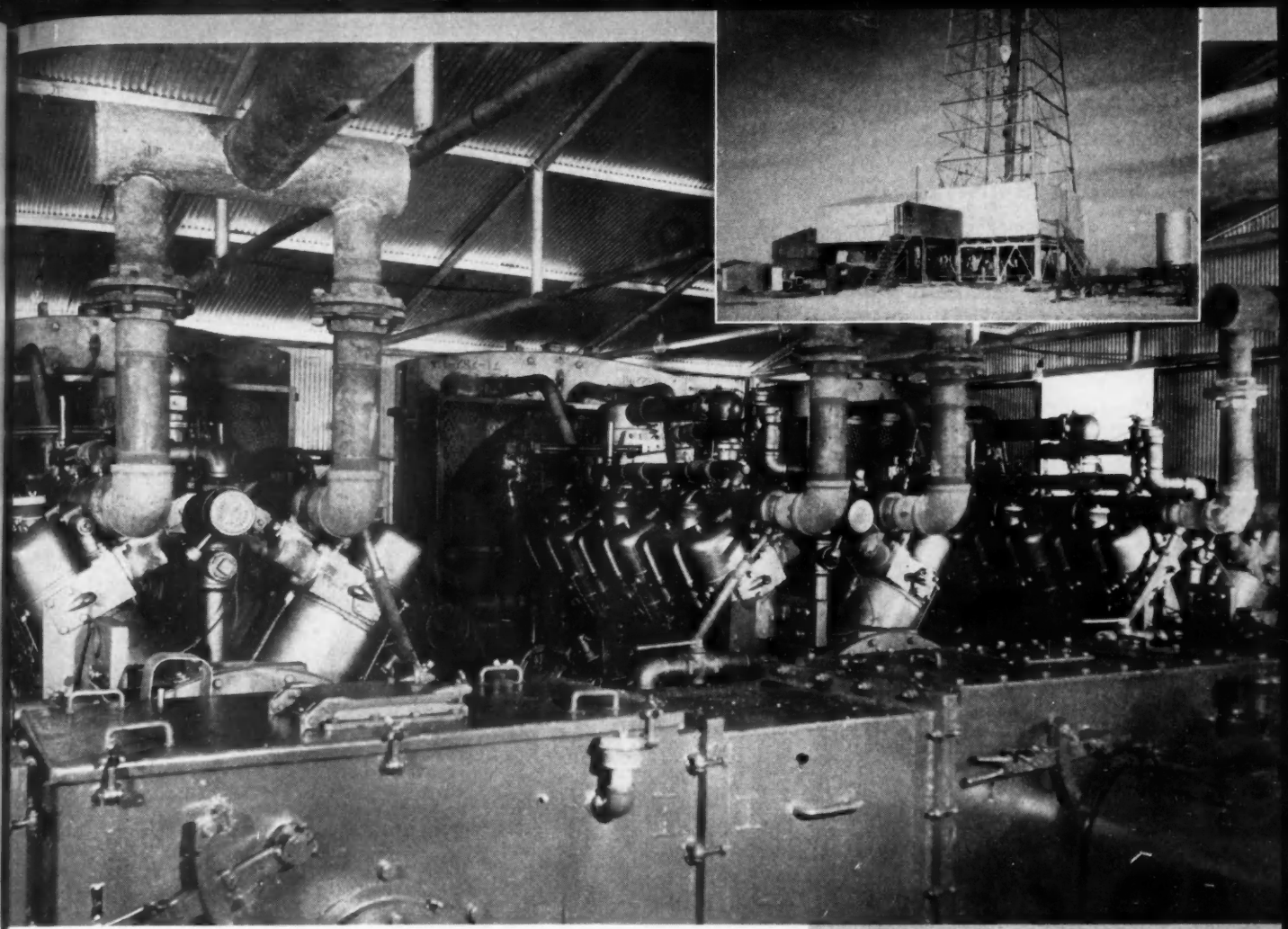
Circle No. 133 on Postcard, Page 315

Enardo Manufacturing Company

Booths 257 and 258, Oklahoma Building

PRODUCTS DISPLAYED:

Safety Gauging Hatch; Spring Loaded Gauging Hatch; Oil Valve; Gas Valve; In-Line Valve; Stack Valve; Diaphragm Vent Valve; Tank Shut-Off Valve; Liquid Level Controller; Automatic Fill Valve; By-Pass Gauging Hatch; Time Cycle Switches; Clock Shut-Off Valve; Dead Weight Gauging Hatches; Slip-On Pipe Fittings; Shur-Loc Pipe Fittings; and Automatic Rod-Line Hook Off.



ALMOST 5 years of drilling service — with but very little repair work and only an occasional top overhaul! That's real performance — the kind of performance two Le Roi L3000's gave Trigg Drilling Company of Oklahoma City.

And — they delivered the power, the fast acceleration, the vibration-free operation Le Roi engines have long been famous for. Thanks to this exceptional power and smoothness, they handled 15,000 feet of 4½" drill pipe easily, according to Mr. Clay Trigg.

It's no wonder Trigg Drilling Company selected Le Roi to power the three-engine rig shown above. It's no wonder they now have a total of seven L3000's on their three rigs and an additional two Le Roi H2000's.

Reports from all fields show that you can count on Le Roi for dependability and economy under continuous loads. You can count on Le Roi for lugging power at slow speeds. You can count on Le Roi for plenty of reserve power to help your crew out of the tight spots.

Enjoy these advantages — insist on Le Roi power on original equipment and as replacement engines. Ask your rig manufacturer, supply house, or Le Roi distributor to show you Le Roi engines at work.

LE ROI

LE ROI COMPANY

MILWAUKEE 14, WISCONSIN

Plants: Milwaukee • Cleveland • Greenwich, Ohio

Oil Field Headquarters: Tulsa, Oklahoma

P-119

Service as Near as Your Telephone

Complete parts stocks . . . Skilled mechanics on 24-hour call . . . Unexcelled overhaul facilities

Oilfield Sales-Service Network

Oklahoma
Le Roi Company Branch — Tulsa
Carson Machine & Supply Co. — Oklahoma City

East & South Texas, Gulf Coast
Southern Engine and Pump Company — Houston, Kilgore, Edinburg, Dallas, San Antonio, Corpus Christi, Texas, and Lafayette, Houma, Louisiana.

North & West Texas, New Mexico
General Machine & Supply Co. — Odessa, Snyder, Texas.
Nortex Engine & Equipment Co.—Wichita Falls, Texas.

Kansas
Carson Machine and Supply Co.—Great Bend

Illinois — Western Kentucky
Western Machinery & Engine Company — Centralia, Illinois and St. Louis, Missouri.

Michigan
Hafer Engine Service — Reed City

Rocky Mountain Area
Gehring Equipment Co. — Casper, Wyoming, Rangeley, Col.

Mississippi, Arkansas and Northern Louisiana
Ingersoll Corporation — Shreveport, Louisiana, Jackson, Mississippi, El Dorado, Arkansas

West Coast
Le Roi-Rix Machinery Co. — Los Angeles, Long Beach and Bakersfield, Calif.

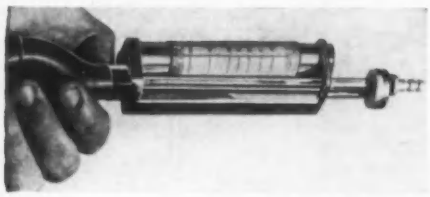
Appalachian Area
P. C. McKenzie Co., Pittsburgh, Bradford.

Canada
Lucey Export Ltd. — Calgary, Edmonton, Alberta.

Mine Safety Appliances Company

Booths 48 and 49, Oklahoma Building

NEW PRODUCTS DISPLAYED:



MSA Aromatic Hydrocarbon Detector is a compact, portable easy-to-use instrument for fast determination of benzene, toluene and xylene.

Circle No. 134 on Postcard, Page 315

MSA Explosimeter, Model 5, a portable simplified combustible gas indicator is especially developed for testing leaded gasoline.

Circle No. 135 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

MSA Skullgard protective hat and MSA glass fiber hats.

Continental Motors Corporation

Block P

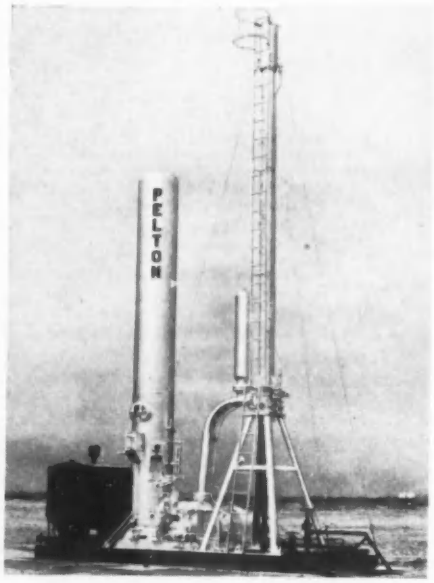
PRODUCTS DISPLAYED:

Fifteen Representative Models of Gasoline, Butane and Cushioned Power Diesel Oil Field Engines and Power Units.

Pelton Water Wheel Company

Block 104 and Booth 20, Park Lane

NEW PRODUCTS DISPLAYED:



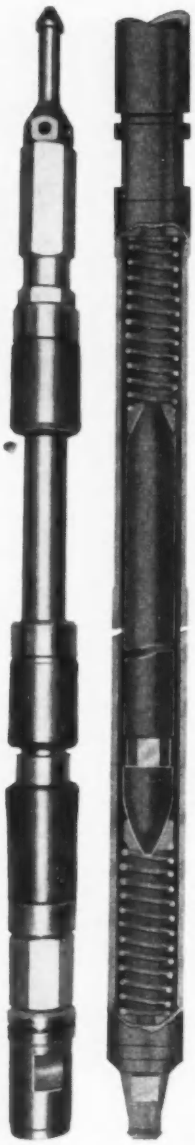
Model "G" Long Stroke Hydraulic Pumping Unit, with maximum polished rod load ratings up to 35,000 pounds, has simplified operating controls. The hydraulic circuit of the new 20-foot model also is simplified. Skid mounted, the unit is easily portable to minimize installation time. It may also be operated by either internal combustion engine or electric motor on an automatic time-clock schedule.

Circle No. 136 on Postcard, Page 315

Kobe, Inc., Division of Dresser Equipment Company

Block 11

NEW PRODUCTS DISPLAYED:



Kobe Bottom Hole Pressure Bomb Cartridge is a new Kobe Free Pump auxiliary item which makes readily available bottom hole pressure and temperature surveys. The cartridge is a tube made up on the lower end of the Kobe free pump and within it is suspended between springs the pressure bomb. The assembly is circulated in or out of the well by turning a valve handle at the surface. When the assembly reaches bottom a special packer nose assembly provides the fluid seal required for the operation of the hydraulic Kobe free pump. As the free pump begins stroking, the pressure bomb records the pump intake pressure. Static bottom hole pressure is obtained by shutting off the hydraulic power fluid after the pump has made a few strokes. It can be run, operated, and surfaced by one man. Time required for either running or surfacing is usually less than two hours.

Circle No. 137 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Size 2 and Size 3 Kobe Power Units; Kobe Central Power Control Station; A Lucite Model showing operating details of the Kobe Free Pump Well System below ground.

Hydraulic Pumps, Inc.

NE corner of California Building on Silver Lane

NEW PRODUCTS DISPLAYED:

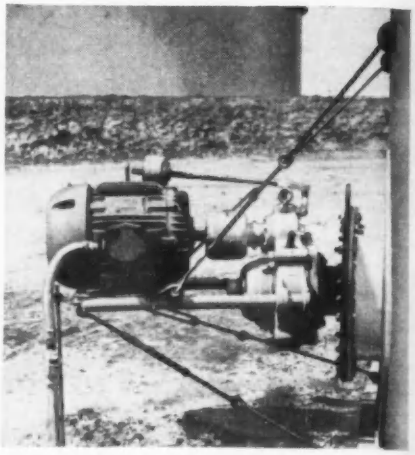
The Carlisle Bottomhole Fluid Motor and Pump is so constructed that a standard plunger and working barrel operates as a double acting fluid motor. Attached to the power piston is one end of a connecting rod operating through a packing and having its other end attached to a plunger which operates as a double-acting pump. At the top end is a reciprocating valve which directs the flow of power fluid to either end of the fluid motor piston. This valve is controlled by a pilot valve which is actuated by a helical spring. At sufficient compression this spring instantly operates the pilot valve, causing power fluid to operate the reciprocating valve, thereby directing the power fluid to the power piston. The power fluid generator unit consists of a radial pump, switches, gauges, and fittings. This size unit is capable of producing 200 bpd at 6000 feet.

Circle No. 138 on Postcard, Page 315

Sawyer-Jensen-Ross Company

Block 5, Silver Lane

NEW PRODUCTS DISPLAYED:



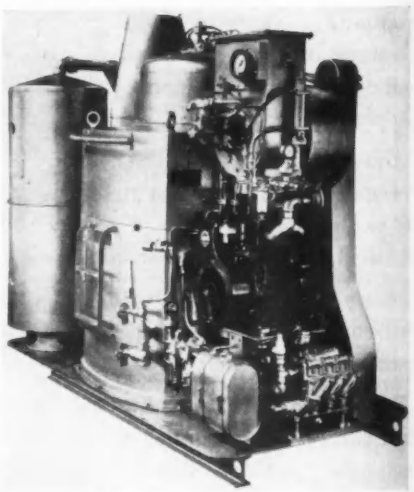
Shortstir Side Entering Mixers, available in 1-25 hp sizes, prevent sediment accumulation in storage tanks and eliminate downtime for clean-outs. Wasted bottoms are saved and maximum storage capacity is maintained.

Circle No. 139 on Postcard, Page 315

Texsteam Corporation

Block V

NEW PRODUCTS DISPLAYED:



New Texsteamers (Vapor-Clarkson steam generators) of different sizes, develop 200 pounds steam pressure in two minutes from cold water and produce from 300 to almost 5000 pounds of steam per hour, at 10 to 600 pounds working steam pressure.

Circle No. 140 on Postcard, Page 315

A New Texsteam-Hydraulic-Pump.

Circle No. 141 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Various Types of Texsteam Safety Valves; Bailey Pressure Reducing Valves; Texsteam Injector Pumps.

THE LAYNE Way... IS THE "Know How Way" IN GRAVEL PACKING

Gravel Packing is a subterranean engineering problem and has been a Layne specialty for years. Each well requires individual treatment. Successfully applied to thousands of wells at all depths, Gravel Packing has proven conclusively it will control sand, when other methods have failed.

The Layne patented method of gravel packing is with circulation. The gravel and well are under control at all times. This method was developed and perfected after years of actual field experience and extensive research.

Layne Gravelling Equipment consists of specially designed high pressure mixing drums, pump, manifolds, control valves, etc., assembled into a unit and mounted on a truck. For off-shore jobs the unit is mounted on skids. The gravel is measured when placed in the drums and mixed with fluid, then deposited in the well under pressure.

for complete information write

THE LAYNE AND BOWLER COMPANY

General Office & Factory

7800 MARKET STREET HOUSTON, TEXAS

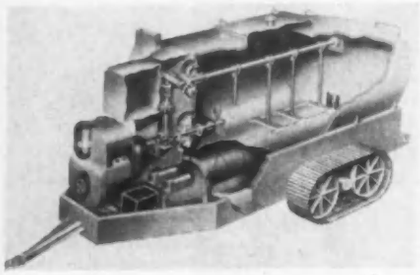
Crutcher-Rolfs-Cummings, Inc.

Block 115

NEW PRODUCTS DISPLAYED:

The new C-R-C Pipe Bender bent thin wall pipe one-half degree per foot in recent tests. No heat at all is used in this bending process. In vertical bending the degree of bend may be easily measured with a level or bubble-type protractor.

Circle No. 142 on Postcard, Page 315



The "SP" Dope Kettle is especially designed with a combination of propeller and sweep agitation which assures uniform temperature from top to bottom of the kettle. Special insulation helps to reduce fuel consumption and a positive plug type shut-off valve and elimination of coking give maximum efficiency at minimum maintenance cost.

Circle No. 143 on Postcard, Page 315

The C-R-C Middle-Incher Ditching Machine uses hydraulic power to replace gear-and-sprocket drives, an advantage being that the speed of the conveyor works independently of the speed of the digging wheel. The middle-incher has been designed with a torque-converter drive which insures an even flow of power to the digging wheel regardless of digging conditions encountered. It cuts a 46-inch wide ditch with a maximum digging depth of seven-and-a-half feet.

Circle No. 144 on Postcard, Page 315

New Deal Specialty Co., Inc.

Booth 44N, North Extension

NEW PRODUCTS DISPLAYED:

The Deep Well Casing Elevator has been developed from the Butler Casing Elevator to be used with weldless links, eliminating the necessity of having separate links for the elevator, since links used on the drill pipe elevator can be used with the Deep Well Casing Elevator. The one-piece bowl eliminates opening and closing the elevator each time a joint of pipe is run.

Circle No. 145 on Postcard, Page 315

The Butler Type Automatic Casing Spider has been used to run the longest strings of pipe which have been run.

Circle No. 146 on Postcard, Page 315

The Deep Well Dead Line Anchor Clamp, used on some of the deepest wells drilled in the United States, has proven itself to be the fastest, most economical dead line anchor clamp on the market. The clamp is a time-saving device.

Circle No. 147 on Postcard, Page 315

Butler Type Wire Line Drilling Clamps are used on cable tools in the drilling of wells and on the rotary drilling rigs to control the spooling of the wire line on the drums. By using the clamp for this spooling process, the line is wrapped evenly and tightly, saving time and wire rope.

Circle No. 148 on Postcard, Page 315

Young Radiator Company

Booths 67 and 68, Scientific and Technical Building

PRODUCTS DISPLAYED:

Stamped Tank Sheet Metal Radiator Designed for Gas or Diesel Prime Mover Installations; Motor-Type Cast Tank Radiator; Mono-Weld Sectional Radiator for Heavy-Duty Gas, Gasoline and Diesel Engine Cooling; Jacket Water Cooler for Jacket Water and Fluid Cooling of Diesel, Gas, Gasoline Engines; Shell and Tube Heat Exchanger for Lube Oil and Engine Jacket Water Cooling; "OSH" Unit Oil Cooler; "Vertiflow" Unit Heater; Gas-Fired Unit Heater; a Typical Blast Coil for Central Plant Heating, Ventilating and Air Conditioning; a Water Coil for Cold Water Cooling Systems.

Morse Chain Company

Booths 14, 15, 16, Silver Lane

NEW PRODUCTS DISPLAYED:

Morse Hy-Vo Drive Unit incorporates revolutionary design principles which overcome limitations of conventional chain drives and enables it to transmit more power at higher speeds than was ever possible. The Hy-Vo is now being successfully used on hundreds of mud pumps and other drilling rig applications, as well as an almost infinite variety of general industrial applications. Because of its adaptability to high speed operation, smaller, less expensive engines and motors can be used with savings in both initial and operating cost.

Circle No. 149 on Postcard, Page 315

International Harvester Company

Block 101

PRODUCTS DISPLAYED:

A Six-Wheel International Model RF-210, powered by the famous International Super Red Diamond 450 engine, is durable, powerful, and reliable for a cross-country haul of oil field equipment.

Circle No. 150 on Postcard, Page 315

A Six-Wheel International Model RF-195 with bulk cement trailer gives rugged dependability and efficiency in oil field service operations.

Circle No. 151 on Postcard, Page 315

The New Travelall offers panel-truck capacity plus passenger-car features. It seats eight comfortably, or, with one or both rear seats removed, offers space for tools and equipment.

Circle No. 152 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Complete Line of Crawler Tractors; Carbureted and Diesel Engines; Loaders; Inside and Outside Dozers; Pipebooms; Winches; Backfillers; Hough "Payloader"; Oil Field Bodies; Utility Bodies; Tractor Tilt Cabs; Welding Trucks; Trailers; Electric Generators; Drott Front-End Loader; Wagoner Loader, AI 23 Mower.

Justrite Manufacturing Company

Booth 17, Scientific and Technical Building

NEW PRODUCTS DISPLAYED:

New Heavy-Duty Safety Lantern, just perfected, has long life, rugged construction.

Circle No. 153 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Safety Cans; Portable Hand Lanterns.

The Wheland Company

Block 1

NEW PRODUCTS DISPLAYED:

HP-14000 Power Pump, 350 hp, 7½" x 14" duplex, has an exclusive patented water cylinder head and liner packing assembly, screw type stuffing boxes and improved pot cover design.

Circle No. 154 on Postcard, Page 315

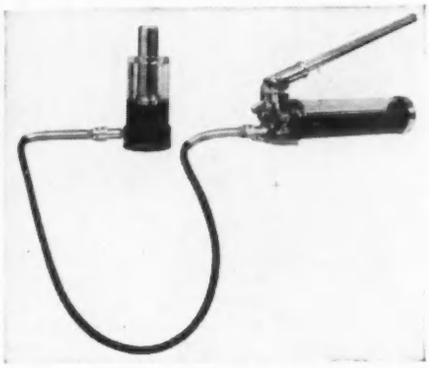
OTHER PRODUCTS DISPLAYED:

E-6100, E-6200, and E-6600 Swivels; A-17-C 17½" Rotary Table; A-20-A 20½" Rotary Table; K-1350 135 Ton Traveling Block.

Templeton, Kenly & Company

Booths 42 and 43, Texas Building

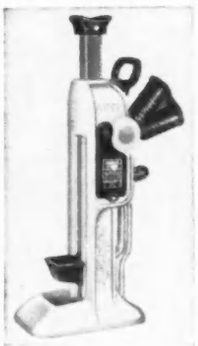
NEW PRODUCTS DISPLAYED:



The Simplex Re-Mo-Trol, remotely controlled hydraulic puller for both pulling and pushing, will be shown in a plastic model showing oil flow through the unit and demonstrating its operation. A "Center-Hole" construction extends the application of the puller to pulling axles, shafts, etc., because a connecting rod can be attached to the object to be pulled and the rod drawn through the center of the Re-Mo-Trol. The puller is portable and available in capacities of from 10 to 100 tons.

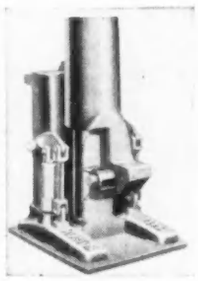
Circle No. 155 on Postcard, Page 315

A Light Weight Ratchet Lowering Lever jack with an aluminum housing, known as the Simplex A1022, is ten tons in capacity but weighs only 42 pounds. The A1022 is designed for light weight versatility for general purpose oil field uses, and incorporates other features of the Simplex line, including drop forged and machined alloy steel operating parts, double-lever sockets, adjustable, cadmium-plated springs and links, multiple-toothed pawls, lubricated trunnion bearings and shorter fulcrum centers.



Circle No. 156 on Postcard, Page 315

The Simplex-Rol-Toe, a hydraulic jack, has a lifting capacity on the toe identical to the lifting capacity on the cap. The lifting operation is smoother because the broad 4½ inch by 4½ inch toe always remains in an even position, riding on a bearing roller that carries the radial head against a stationary ram's flat-milled surface. The Rol-Toe, model RTJ-25, has a 25 ton capacity and a 7-inch lift with minimum heights of 2½ inches when lifting on the toe and 14 inches when lifting on the cap. The Rol-Toe has two separate pumps, a high speed pump for positioning and lifting lighter loads and a high pressure pump for heavy lifting. A safety by-pass valve is provided to guard against overloading.



Circle No. 157 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Simplex No. 310A Emergency Ratchet Lowering Swivel Base Jack; 5 to 20-ton capacity Standard Lowering Level Jacks; Cable Tensioning Jacks; Pole Pulling Jacks; Standard Speed Jacks; Shoring Jacks; Push and Pull Jacks; Standard Hydraulic Jacks; Self Contained and Remote Controlled Center Hole Hydraulic Pullers; Pull Rod Jacks.

Victaulic Company of America

Booth 90, Texas Building

NEW PRODUCTS DISPLAYED:

Victaulic Pipeline Fittings, including 45- and 90-degree elbows and tees, are especially designed for connections to producers' field tanks. These new fittings screw directly into stop-cock valves without the need of adapter fittings and incorporate the Victaulic full-flow sweep radii for minimum resistance to flow.

Circle No. 158 on Postcard, Page 315

Victaulic Snap-Joint (Boltless) Couplings are in one piece with a hinge and toggle in place of the familiar two-assembly bolts. These couplings provide extra speed and savings for lines frequently disconnected or relocated and offer new features for service lines to drilling rigs and other piping frequently dismantled.

Circle No. 159 on Postcard, Page 315

Victaulic Look Box is designed to economize materials and speed the pumper's inspection duties. Consisting of a Victaulic Cap #60, it is provided with an easy-to-open screw cap which functions in place of the usual bull plug. The Victaulic Look Box design is simple and saves time and cost. Sizes are two inches through four inches.

Circle No. 160 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Victaulic Couplings; Victaulic Full-Flow Elbows, Tees, Caps, Reducers, Reducing Tees, Laterals, Crosses, Nipples, and other fittings; Vic-Groover Tools; Victaulic Snap-Joint; and Victaulic Roust-A-Bout Couplings.

Hobart Brothers Company

Block 115, West Extension

NEW PRODUCTS DISPLAYED:

The New 250-Ampere "Pipeliner" Gas Drive Arc Welder is compact and light in weight for easy handling and moving, but has a hot, fast, dependable arc, and plenty of engine power. The generator has four laminated main poles with four interpoles and removable pole pieces. A heavy copper switch, moulded in bakelite and operated by a convenient hand wheel, makes it easy to select the desired main current range. Fine adjustment of volt-ampere values is positively and quickly obtained through a knob controlling the volt-amp adjuster. When the arc is struck the engine quickly comes up to operating speed and, when the arc is broken, it slows down to economical idling speed. In pipe line work, this machine is usually mounted on a truck or dragged along on a sled.

Circle No. 161 on Postcard, Page 315

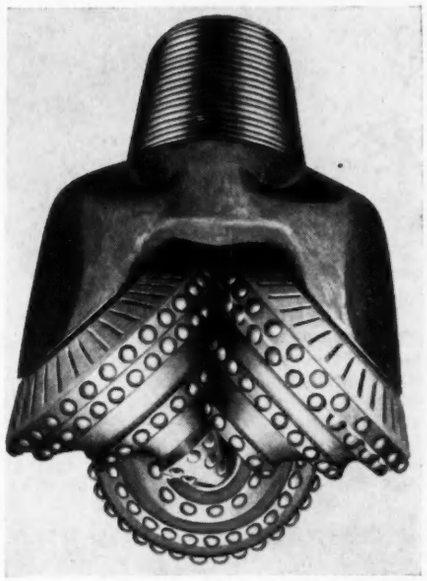
OTHER PRODUCTS DISPLAYED:

"Husky Boy" Aircooled 200 Ampere Gasoline Drive DC Arc Welder; Complete Line of Arc Welders and Electrodes.

Hughes Tool Company

Block 106

NEW PRODUCTS DISPLAYED:



Type R-1 Bits have no milled teeth but sintered tungsten carbide and forged alloy steel are combined to produce an abrasion-resistant cutting surface. This is a special purpose bit and performs to best advantage only in those formations for which it has been designed, particularly in sections having a high concentration of chert, where loads of approximately 4000 pounds per inch of bit diameter and rotative speeds of 30 to 40 rpm have been used.

Circle No. 162 on Postcard, Page 315

Tri-Cone Jet Bits are equipped with nozzles positioned to jet on bottom of the hole. The jet nozzles direct a high velocity stream to remove the loose cuttings. The flow pattern set up, as a result of the design of the nozzles and the force of the jet stream, creates sufficient turbulence around the bit cutters to keep them clean.

Circle No. 163 on Postcard, Page 315

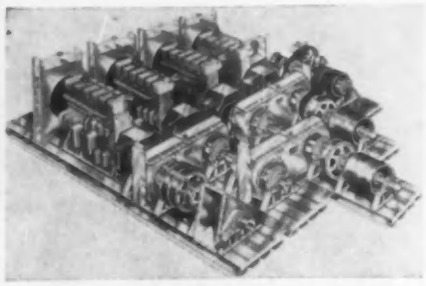
OTHER PRODUCTS DISPLAYED:

Tri-Cone Rock Bits; Jet Bits; Type R-1 Insert Bits; Bit Breakout Plates; Flash-Weld and Seal-Grip Tool Joints; and Core Bits.

Mid-Continent Supply Co., Inc.

Block 3

NEW PRODUCTS DISPLAYED:



The AE (Any Engine Rig Drive) is a new swinging compound rig drive displaying three popular large gas engines of different manufacture. The fourth four-runner skid in the four engine rig drive is left bare to show the rugged construction. The swinging compounds permit the operator to move his four-engine rig drive in four legal highway packages wtihout breaking a chain or chain guard.

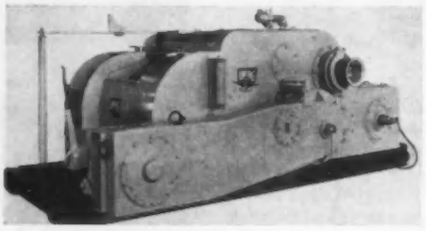
Circle No. 164 on Postcard, Page 315

The 9360 Cummins Multiple Engine Rig Drive with six Cummins Model LR (gas or diesel) engines features the swinging compounds which enable the operator to break his rig drive into legal highway loads without breaking a chain or opening a chain guard.

Circle No. 165 on Postcard, Page 315

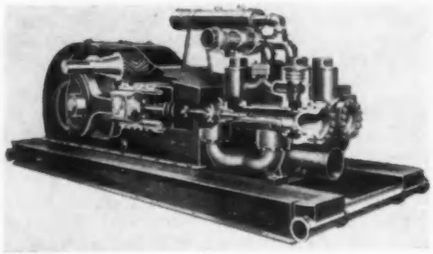
Regan AN-55 Crown and Traveling Blocks are the latest development in hoisting equipment. The six sheave traveling block is rated at 500 tons. The pins in the new design are hollow and accommodate a liberal supply of grease. These pins are an integral part of the sheave and carry the inner race for the Regan bearings. This inner race is 12¼ inches in diameter. A cut-away model will show the method of mounting and lubricating the bearings from an easily reached external grease fitting.

Circle No. 166 on Postcard, Page 315



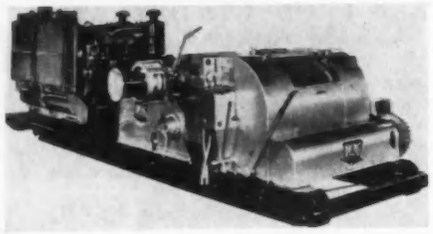
Unit Rig U-30 Drawworks, the powerful 1600 horsepower unit, will be shown with the Mid-Continent Swinging Final Drive and the 9360 Cummins Multiple Engine Rig and Pump Drive.

Circle No. 167 on Postcard, Page 315



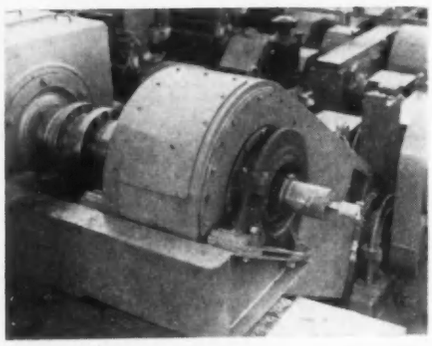
EMSCO Pumps ranging from the D-175 to the D-850 will be on display. These pumps feature the eccentric type power end with herringbone gears and all steel construction.

Circle No. 168 on Postcard, Page 315



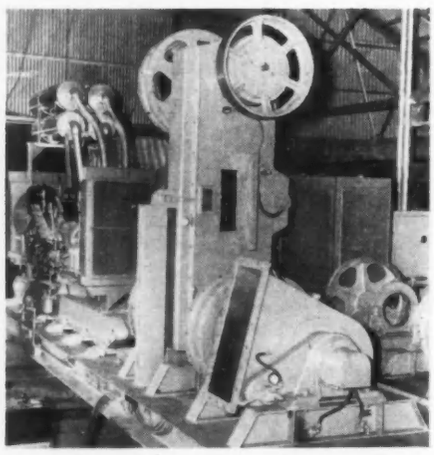
Unit Rig U-15 with an NHRS-600 Cummins dual diesel engine will be displayed. This rig is an economical and easily transported unit featuring the Twin-Disc fluid coupling.

Circle No. 169 on Postcard, Page 315



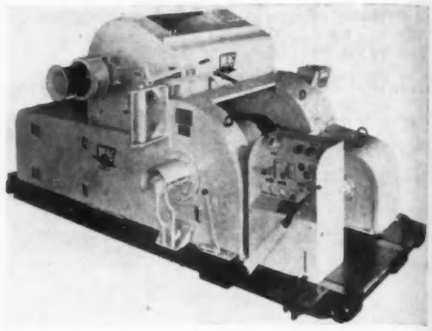
Circle No. 170 on Postcard, Page 315

The Swinging Final Drive will appear with the U-30 Unit Rig drawworks and 9360 Rig Drive. These swinging drives are the solution to chain lubrication and "big rig" mobility. The power end of a 20,000



foot drilling rig can be broken into easily transported packages without exposing the bearings or chain to moisture, dust and dirt normally present on location.

Circle No. 171 on Postcard, Page 315

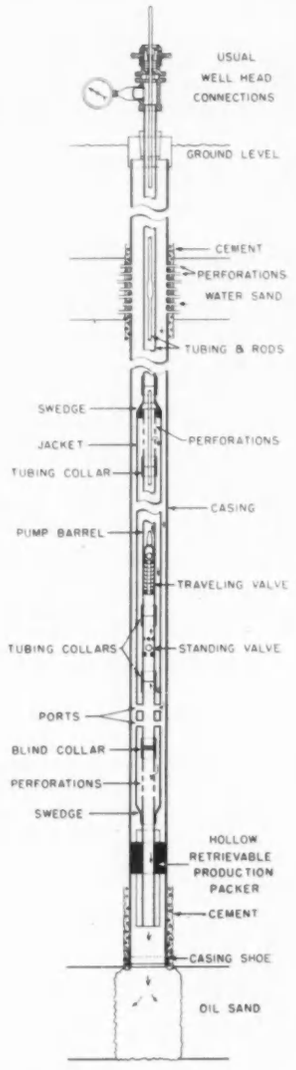


Unit Rig U-20 Drilling Unit is a new 1200 horsepower drilling unit and is displayed with three NHRS-600 Cummins dual diesel engines with the Twin-Disc fluid couplings built into the engine compounding boxes mounted on a U-37 compound.

Circle No. 172 on Postcard, Page 315

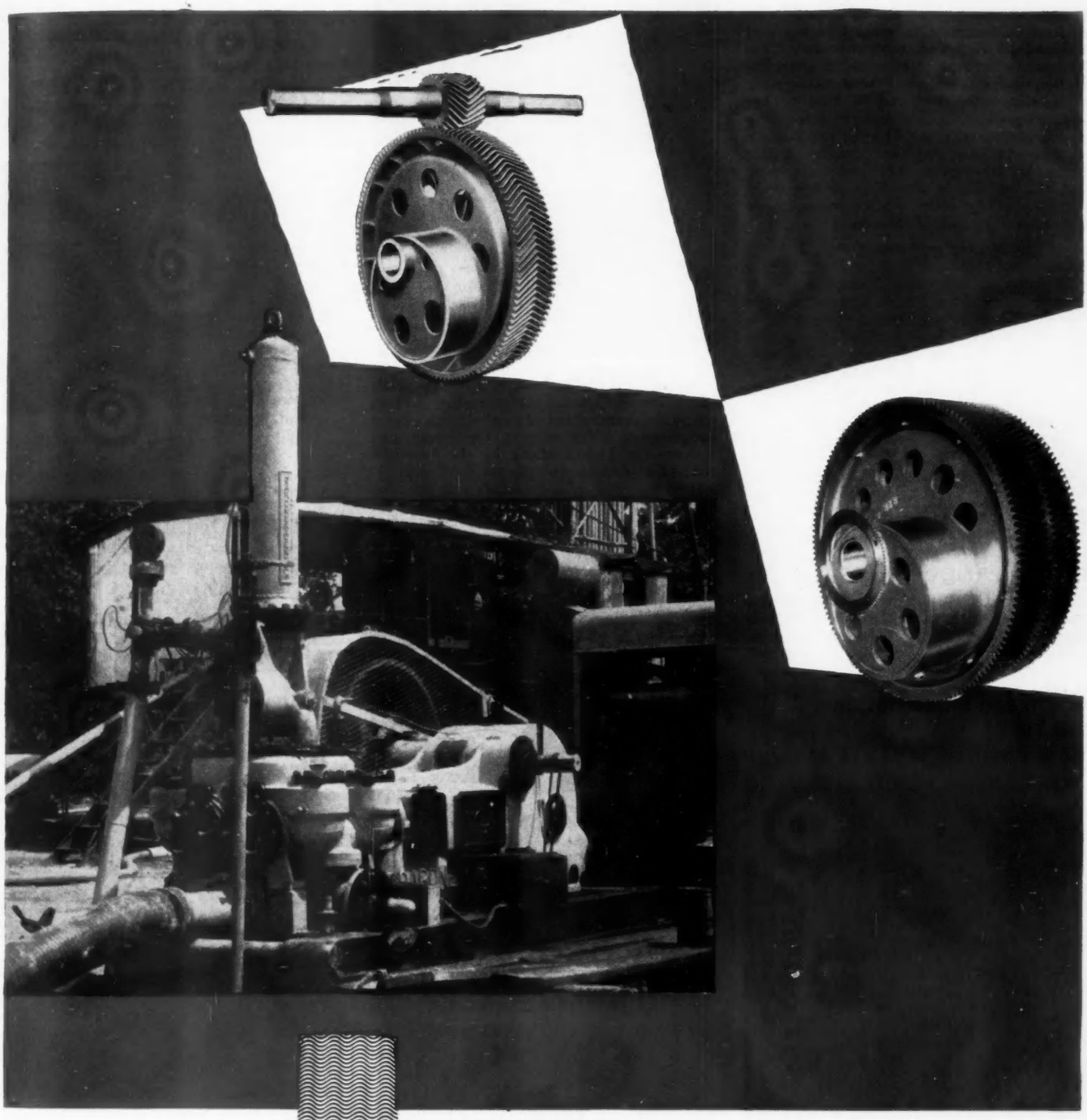
Sperry-Sun Well Surveying Company

Booth 82, Scientific and Technical Building



NEW PRODUCTS DISPLAYED:

Sperry-Sun Subsurface Water Injection Pump permits forcing subsurface water under pressure with a lower oil zone which is to be water flooded. A completely



S-M-O-O-T-H!

The precision-cut herringbone or double helical gears on a Gardner-Denver Mud Pump transmit power smoothly—withstand sudden high plunger loads without flinching. For complete specifications, ask for Bulletins FX-10 and P-70.

SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd.,
14 Curity Avenue, Toronto 13, Ontario

Dallas • Houston • Tulsa • St. Louis
Los Angeles • San Francisco • New York • Chicago • Pittsburgh • Denver
New Orleans • Continental Supply Co., Continental Bldg., Dallas, Texas. Export Division: 30 Rockefeller Plaza, New York, N. Y.
Republic Supply Co. (Of Calif.), 2600 S. Eastland Ave., Los Angeles, Calif.

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

closed system is utilized. This is accomplished by means of a special jacket and a standard rod and tubing pump. This equipment permits calculation of water injection rates, minimizes well conversion costs, eliminates the need of dual packer settings and withstands maximum working pressure requirements. It provides surface working pressure without raising source water to the surface. The items noted on the left side of the drawing are furnished by Sperry-Sun; other items to complete the installation are all standard parts.

Circle No. 173 on Postcard, Page 315

Sperry-Sun Magnetic Multishot survey service provides accurate inclination and direction readings at regular intervals in uncased holes. The instrument may be lowered in the hole on a wire line, may be go-deviled into a K-monel collar, or it may be lowered into the hole within a K-monel collar as the collar is lowered; the instrument may then be retrieved by a wire line overshot. Survey interval is 100 feet on wire line and 95 feet on drill pipe. Recordings are made photographically on a film strip and read by means of a special reader.

Circle No. 174 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Sperry-Sun Telefloodmeter and application of the Sperry-Sun E-C Inclinometer and Single Shot instruments to crooked hole measurements.

Gar Wood Industries, Inc.

Block 118

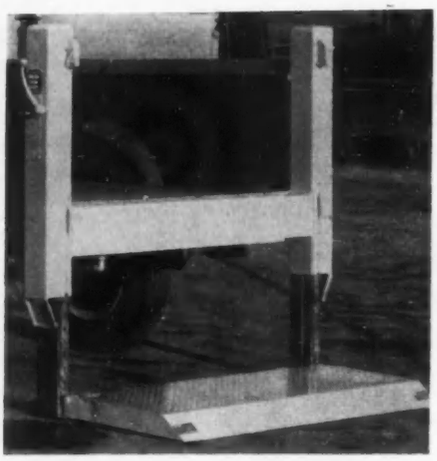
NEW PRODUCTS DISPLAYED:

Buckeye Model 306 Utility Ditcher has eight speeds forward and two reverse speeds. The ditcher has a maximum depth of cut from 5 to 6 feet with widths of cuts varying from 12 to 24 inches. The exclusive Buckeye, heavy duty non-clogging, self-cleaning crawlers clean themselves even in mucky soil.

Circle No. 175 on Postcard, Page 315

Gar Wood Winches, Models 2MB, 3MB, 4MB, 5MB, 6MB, and 7MB, are utility, draymen and oil field winches having full cab control of jaw clutch, band type drum brake, and power take-off. Detachable back draft drum clutch is furnished on Models 2MB and 3MB. Accurately machined straight jaw and flame hardened jaw clutches are furnished on Models 4MB, 5MB, 6MB, and 7MB.

Circle No. 176 on Postcard, Page 315



National Lift-O-Matic Elevating Tailgate, the hydraulic tailgate for pickup trucks, is constructed of steel with a lifting capacity of 1000 pounds. One man can operate the Lift-O-Matic by the fingertip control at the rear of the truck. Easily installed on most pickups with express type bodies, the Lift-O-Matic weighs only 350 pounds.

Circle No. 177 on Postcard, Page 315

Buckeye Model 314 Pipe Line and Utility Ditcher is engineered for increased ditch footage and decreased unit cost. Fluid coupling provides cushioned power from the engine and all controls are grouped within convenient reach of the operator. The Model 314 has many uses including cross country pipe line for oil and gas, gathering lines or loops in oil and gas fields.

Circle No. 178 on Postcard, Page 315

Gar Wood Cable Operated Dozecaster is offered in Models CD-203, CD-153 and CD-93 with main frame box section varying in these models from 12 feet, 8 feet, and 7 feet.

Model 281 Power Control Unit on Allis-Chalmers HD-20 Tractor offers fast, accurate control and smooth action. Completely equipped with totally enclosed heavy duty anti-friction bearings, the tractor has all gears totally enclosed and run in oil bath.

Circle No. 179 on Postcard, Page 315

American Sand-Banum Company, Inc.

Booth 53, California Building

NEW PRODUCTS DISPLAYED:

Sabanol is a neutral, concentrated liquid fuel oil treatment absolutely free of abrasives, benzene, petroleum solvents, alcohol, ether, carbon tetrachloride or any other chlorinated solvents. This homogenizing fuel oil treatment controls sludge and assures maximum burnability of all grades of fuel oil. Containing an exclusive soot retardant and rust inhibitor, it is non toxic, guaranteed harmless to personnel and equipment, and has a flash point of over 200° F.

Tinallium Pro-Tex-It is a product of grease-like consistency which has been solving many lubrication and corrosion problems.

Circle No. 180 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Standard Sand-Banum; Blue Seal Emulsion Sand-Banum; San-Banum Special in tablet form.

The Guiberson Corporation

Booths 217, 218, 233, 234, Oklahoma Building

NEW PRODUCTS DISPLAYED:

A New Type L Kelly Drive Rotating Drilling Head provides complete control for reverse circulation, conventional circulation, or rocking back and forth. Extremely fast connections are possible due to the unique kelly packing unit which allows power tightening and breakout. Average time required is only six minutes. Over-all height is 24 inches. Base of the head is designed to bolt directly on the Guiberson blowout preventer or it may be studded for 6-inch-400, 6-inch-600, 6-inch-900, 8-inch-400, or 8-inch-600 series. Packing is available for 3- or 3½-inch kelly and stripper rubbers for 2-, 2½-, or 3-inch tubing. The head is rated at 1500 pounds working pressure and 3000 pound test.

Circle No. 181 on Postcard, Page 315

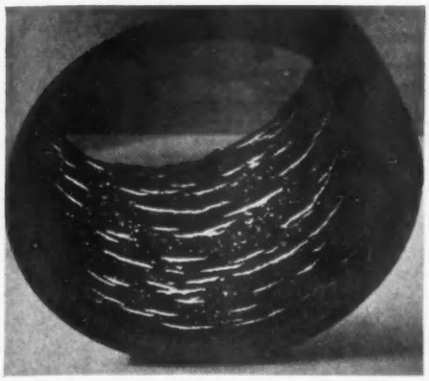
OTHER PRODUCTS DISPLAYED:

Blowout Preventer; Swabs; Packers; Safety Joints; Spiders; Gas Lift Equipment; Savers; Strippers; Unions; Hydraulic Hold Down Anchor; Hydraulic Pump Anchors; and Swab Relief Valves.

Magnaflux Corporation

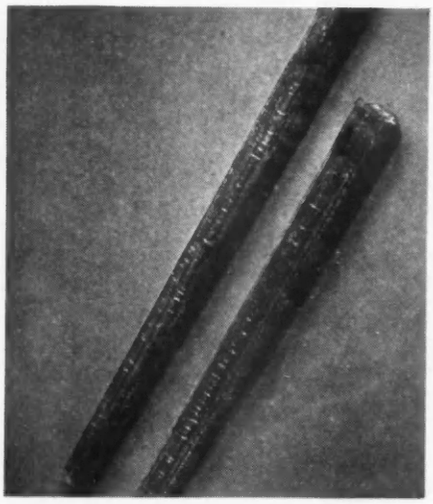
Booths 10-12, Silver Lane

NEW PRODUCTS DISPLAYED:



A New "Magnaglo" Dry Fluorescent Magnetic Powder and technique extends magnetic-particle nondestructive tests which have been extensively used in the petroleum industry. In conjunction with suitable magnetizing equipment, the powder particles will line up on a discontinuity which produced a flux-leakage field. When viewed under "black light," the glowing indications are very brilliant and quite easily detected. This allows rapid inspection of each joint.

Circle No. 182 on Postcard, Page 315



Another new method is the application of Magnaglo (Fluorescent Magnetic Particle Inspection) to locate corrosion-fatigue and fatigue cracks in sucker rods. In the use of this method, the rods are thoroughly cleaned and inspected in rapid succession to detect cracks which will cause failure.

Circle No. 183 on Postcard, Page 315

Purolator Products, Inc.

Booths 17-18, Oklahoma Building

PRODUCTS DISPLAYED:

Filter Units for Filtration of Gasoline and Lubricating Oils for use in Stationary Installations at Airports and Refineries; Filtration Units for Ocean-Going Ships, Military Tanks, Tractors and Planes; Filters for Farm Tractors; Full-Flow Filtration Units for Automotive and Marine Application.

McEvoy Company

Booths 91 and 92, Kansas Building

PRODUCTS DISPLAYED:

Two-inch flanged end 10,000-pound Test McEvoy Automatic Self-Sealing-through conduit-Gate Valve; and three-inch Flanged end Series 1500, 5000 pound WOG, 10,000 Pound Test, Stainless Steel, McEvoy Automatic Self-Sealing Gate Valve.

McCullough Tool Company

Booths 22, 23, and 24, Park Lane

NEW PRODUCTS DISPLAYED:

McCullough's new Radiation Logger with Scintillometer (Gamma Ray and Neutron) will be demonstrated to show its ability to clearly and accurately log beds of any thickness at any speed.

Circle No. 184 on Postcard, Page 315

The Improved M-3 Burrless Bullet Perforator and New Glass Jet Perforator, capable of 25 percent more penetrating ability, will be displayed.

Circle No. 185 on Postcard, Page 315

New Type "B" Drillable Bridge Plug, an expandable, drillable, one-piece, all-metal bridge plug.

Circle No. 186 on Postcard, Page 315

S K F Industries, Inc.

Booths 67 and 68, Texas Building

PRODUCTS DISPLAYED:

S K F's Complete Line of Anti-Friction Bearings and Pillow Blocks; Spherical Roller Thrust Bearings; SKF Hydraulic Method for Mounting and Dismounting Bearings; SAF Pillow Block; SY Pillow Block.

Sheffield Steel Corporation

E. of Block R

PRODUCTS DISPLAYED:

Tank Heads for LPG industry; Structural Shapes; Bolts and Rivets; and Special Alloy Steels for Rock Drills, Springs and other uses.

A. Leschen & Sons Rope Company

Booths 114, 115, Oklahoma Building

PRODUCTS DISPLAYED:

Hercules Red-Strand Wire Rope; Wire Rope Slings.

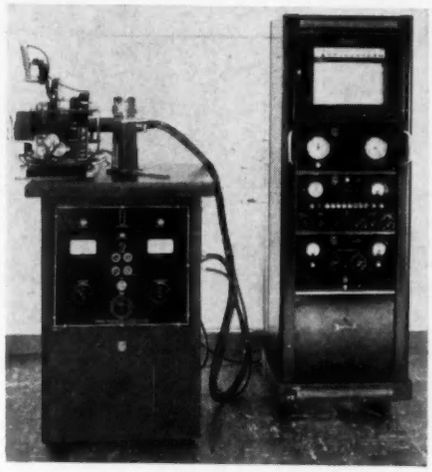
North American Philips Company

Block 122

NEW PRODUCTS DISPLAYED:

The New Philips Electron Microscope (EM-100) has a continuous screen magnification from 1000x to 60,000x and the instrument is capable of producing micrograms of 30 Angstroms resolution or better. Accelerating potentials of 40, 60, 80 and 100 kilovolts are available. The unit's large field permits recording in a single photograph, areas which might otherwise require a mosaic of six sections. A roll film camera is employed, using standard 35 mm. high contrast film.

Circle No. 187 on Postcard, Page 315



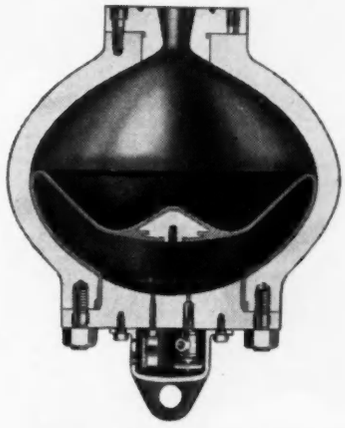
The New Norelco Fluorescent Analysis Unit employs a wide range vertical goniometer with a sweep radius of 170 mm. instead of the horizontal assembly used on the original model. The new equipment utilizes a horizontal, water-cooled oil-insulated X-ray tube operated from a standard water-cooled Norelco diffraction unit. Fluorescence Analysis is non-destructive and permits analysis of small specimens.

Circle No. 188 on Postcard, Page 315

Hydril Company

Block F

NEW PRODUCTS DISPLAYED:



The Hydril K-20 Pulsation Dampener is a large-capacity, pre-charged surge chamber, easily mounted on any slush pump in place of the standard air chamber. The pulsation dampener, simple in design, having few parts, and durable in construction, enables pumps to operate with minimum shock and vibration. It is self-cleaning and requires little attention.

Circle No. 189 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

"GK" Blowout Preventer; Hydril Automatic Pump Accumulators; Hydril Two-Step Thread on Casing, Tubing and Drill Pipe; and the Hydril System of Pressure-Weld.

Young Engine Corporation

Block A, Mid-Continent and Texas Drives

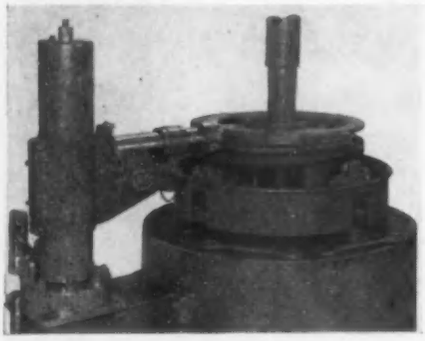
PRODUCTS DISPLAYED:

Gas Drilling Engine; Electric Light Plant; Under-Road Boring Machine.

Ben F. Kelley Company, Inc.

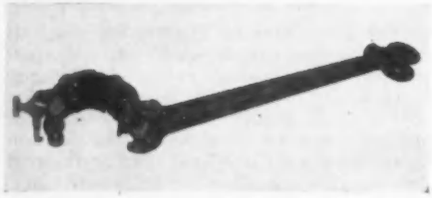
Booths 36 and 37, Silver Lane

NEW PRODUCTS DISPLAYED:



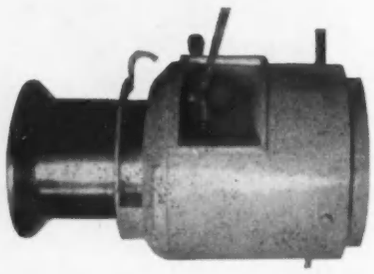
The KelCo Air Operated Power Slip incorporates into its assembly a slip bowl.

Circle No. 190 on Postcard, Page 315



The new KelCo Fulgrip Tubing Tongs.

Circle No. 191 on Postcard, Page 315



KelCo Spinning Line and Breakout Catheads feature an anti-fouling catline spool and it is removable for over-the-road clearance.

Circle No. 192 on Postcard, Page 315

Universal Oil Products Company

Booths 73 and 74, Scientific and Technical Building

PRODUCTS DISPLAYED:

Platformer-Udex Combination; Platformer Units; Udex Units; Platformate; A scale model of the Cosden Petroleum Corporation's recently installed UOP Platformer-Udex combination at the company's Big Spring, Texas, refinery. An illuminated flow diagram showing the flow through the Platformer and Udex units will be an unusual feature of the exhibit.

Le Roi Company

Block 203

NEW PRODUCTS DISPLAYED:

The A114, sister engine to the A288, is a 114-cubic-inch displacement, single-cylinder, valve-in-head pumping engine designed for oil field use with an extra-heavy flywheel to absorb well pump boom shock. The A114 develops 13 horsepower, while its sister unit develops 26 horsepower under load.

Circle No. 193 on Postcard, Page 315

The L4000 is a new V-12 Valve-in-Head Internal Combustion Engine for use in the petroleum industry when heavy sustained loads are encountered. Burning cheap, well-filtered natural gas, the L4000 is especially suited for operations where dependable power must be delivered at minimum operating and maintenance costs.

Circle No. 194 on Postcard, Page 315

Le Roi-Cleveland Drillmaster Pipe Line Drill Rig with adjustable boom arms is mounted on a crawler type tractor. Air for the Drillmaster Drill Rig is provided by the compressor end of a Le Roi 600 cubic feet per minute compressor which is mounted on the tractor and driven through the power take-off.

Circle No. 195 on Postcard, Page 315

The Le Roi H844, a newly-developed 844 cubic inch V-8, valve-in-head, internal combustion engine is designed along the same V-8 lines proven successful in the Le Roi H540. The H844 has oil field applications in lift and gathering pumps, shallow-well drilling rigs and portable general purpose power units.

Circle No. 196 on Postcard, Page 315

T-H540, a valve-in-head, 200 horsepower engine has been developed for quick starts and heavy trucking in oil fields.

Circle No. 197 on Postcard, Page 315

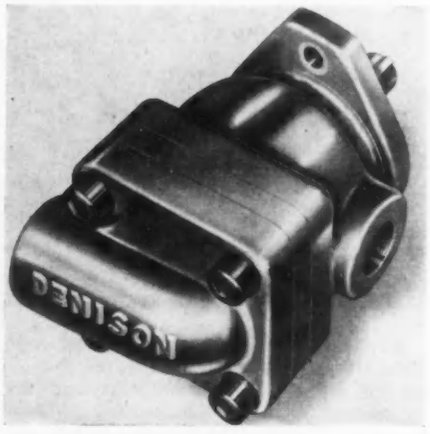
The Le Roi Tractair, a self-propelled tractor-air compressor, consists of a tractor using the Le Roi D226 engine and 105 single-stage air compressor mounted in a single block and coupled on a single crankshaft. An unloader on the compressor end of this unit makes it possible to operate the unit as a tractor alone or as a tractor-compressor combination. This feature gives the contractor complete self-propelled mobility and makes possible a number of special air-powered attachments.

Circle No. 198 on Postcard, Page 315

The Denison Engineering Company

Booths 29N and 30N

NEW PRODUCTS DISPLAYED:

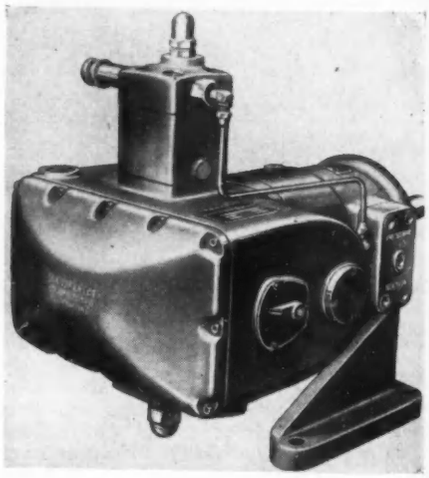


The Denison Pump/Motor provides a single unit in a range of sizes for either pump or motor applications. Hydraulically balanced and completely reversible, this all-purpose unit offers a ready answer to high volume 2000 psi pump needs and compact high torque fluid motor requirements. Sizes up to 70 gpm or the equivalent of 97 hp as a motor are available. These units may be operated in either direction of rotation without change or alteration.

Circle No. 199 on Postcard, Page 315

Multi-Range Flow Control Valves will withstand system pressures up to 5000 psi for not one but several maximum ranges of flow control. The valves are not limited to a single range of operation. A single cartridge-type spool may be simply and easily turned inward or outward regulating an adjustable orifice to fit any pump delivery within that range.

Circle No. 200 on Postcard, Page 315



The Denison Axial Piston, Cross Center, High Pressure, 5000 psi Pump provides reversible flow operation with variable delivery in either direction of operation. The pump is a self-contained circuit that without valving provides reversible flow instantly by changing the direction of the pumping action.

Circle No. 201 on Postcard, Page 315

Herb J. Hawthorne, Inc.

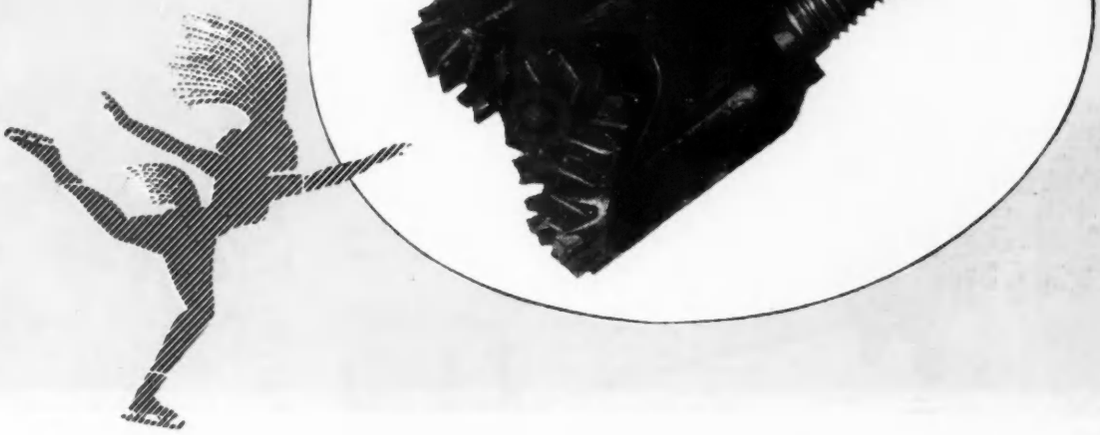
Booth 27N, North Area

PRODUCTS DISPLAYED:

Hawthorne Blue Demon Replaceable Blade Drilling Bits; 1⅞- to 4½-inch bits for minerals exploration and test hole drilling; 3½- to 5⅝-inch bits for oil exploration and seismic shot hole drilling; 4¼- to 11-inch bits for water well drilling; 3⅞- to 7⅞-inch bits for production drilling.

Balanced Design

At Last! The Rock Bit that digs harder – *longer!*



Incorporating the latest improvements dictated by changing field techniques, the COMET Rock Bit has proved its ability in the toughest digging in the world. COMET's Balanced Design assures high shock strength, resistance to wear, and excellent dimensional stability. Available in the popular seismograph sizes, shale and hard rock types, for both mud and air drilling.

COMET EQUIPMENT CO., INC.

Get full information and price list.
Write! Phone! Telegraph!

COMET EQUIPMENT COMPANY, INC.

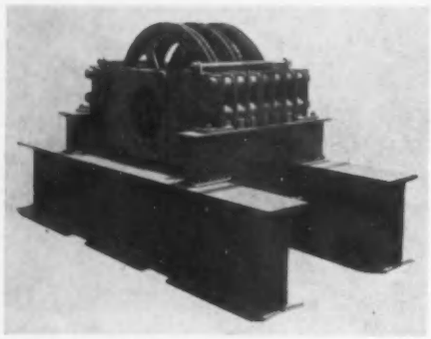
Box 396 Garland, Texas

Telephone: Dallas, Tenison 9911 Garland 3-1275

Regan Forge Engineering Company

Booths 198-200, 251-253, Oklahoma Building

NEW PRODUCTS DISPLAYED:



7AN55-600 Crown Block

7AN55-600 Crown Block and 6AN-55-500 Traveling Block is a set of blocks designed to meet the requirements of offshore drilling barges and has special oversize roller bearings to take care of the deeper drilling done on eight line string ups using the 1⅜ inch wire line. The crown block has seven sheaves and the traveling block six sheaves with dual bearings in each sheave. The crown block has a 600 ton capacity and the traveling block a 500 ton capacity while the sheaves have a bearing capacity of 100 tons per sheave.

Circle No. 202 on Postcard, Page 315

Above: 4A36-160 Traveling Block.

Left: 6AN-55-500 Traveling Block.

4A36-160 Traveling Block is a four-sheave block with 36-inch sheaves rated at 160 ton capacity for use on the jackknife derricks. The sheaves are mounted on dual bearings with the inner race ring rotating with the sheaves.

Circle No. 203 on Postcard, Page 315

3L30-90 Traveling Block is a small block with three 30-inch diameter sheaves mounted on a straight pin and has the outer races of the bearings in the sheaves.

Circle No. 204 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Crown Block for use on Jackknife Derricks.

Olson Filtration Engineers

Booth 88N, North Area

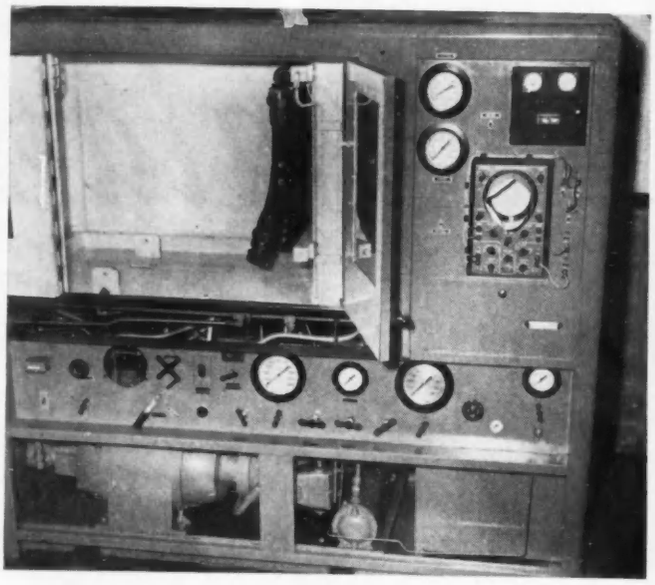
PRODUCTS DISPLAYED:

Olson Tubular Screen Filter with Precoat Tank attached; and Glass Cutaway Pilot Unit in operation.

Stratoflex, Inc.

Booths 97 and 98, Texas Building

NEW PRODUCTS DISPLAYED:



Hydraulic Impulse and Static Hose Assembly Test Stand is used to conduct severe hydraulic tests on hose and hose fittings. It subjects sample hose assemblies to sharp, severe hydraulic impulse or surge pressures and repeats these surges for several hundred thousand cycles or until the sample fails.

Circle No. 205 on Postcard, Page 315

Display Boards showing Stratoflex Hose and Fittings in various sizes and types used by the petroleum industry will be displayed. Featured on the boards will be high, medium and low pressure hose assemblies and Stratoflex detachable, reusable hose fittings.

Stratoflex Fittings with cutaway assemblies showing the operating principles and quality workmanship of the products will be shown.

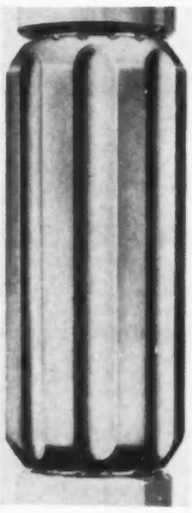
Circle No. 206 on Postcard, Page 315

Security Engineering Division, Dresser Operations, Inc.

Block 11

NEW PRODUCTS DISPLAYED:

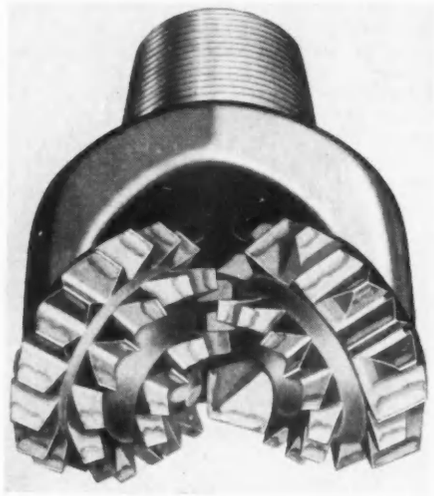
A New Rubber Stabilizer, which insures maximum drill string stabilization, operates in the open hole with efficiency and provides the driller with a safety margin heretofore unobtainable in steel stabilizers. It keeps drill pipe in more perfect alignment with drill bit, reduces drill collar buckling and increases rock bit efficiency. Constructed of an 18-inch rubber sleeve made of an oil and temperature - resistant rubber, the stabilizer is mounted on a one-piece six-foot forged steel mandrel, heat-treated for maximum strength and toughness. The metal portion of the rubber sleeve fits inside the recessed portion of the mandrel and the rubber sleeve can be removed and replaced right at the rig in a matter of minutes. No special tools are required to mount the sleeve.



Circle No. 207 on Postcard, Page 315

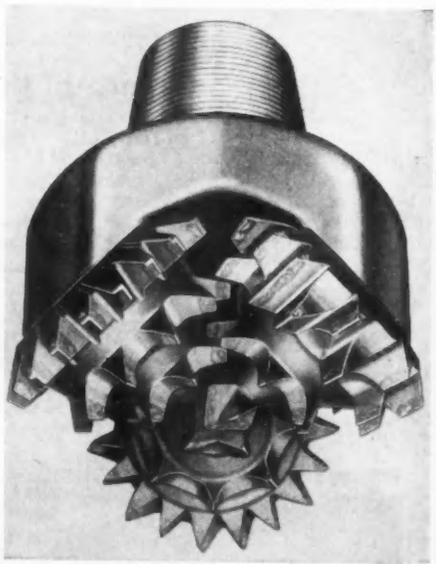
OTHER PRODUCTS DISPLAYED:

Complete Line of Cross-Section Rock Bits; Reamer Rock Bits; Reamers; Hole Openers; Casing Scrapers; and Production Equipment.



Security Two-Cutter Rock Bit

Circle No. 208 on Postcard, Page 315

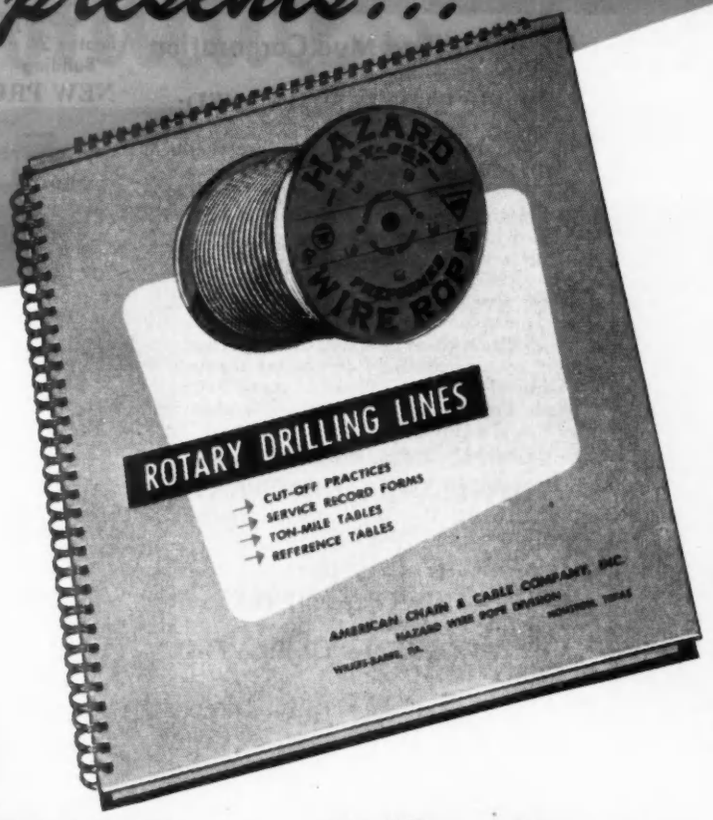


Security Three-Cutter Rock Bit

Circle No. 209 on Postcard, Page 315

HAZARD

presents...



You can see it at

TULSA OIL SHOW

29 and 30 Silver Lane

...a NEW Ton-Mile System

-It Makes Lines Last Longer

• Now you can cut your wire rope costs. Nothing extra to buy. You just follow a new system that keeps your drilling line at its highest efficiency. Your HAZARD distributor will give you full details and tell you how you can get your free copy of this big Ton-Mile Book that gives you all the information. See him today or write our Wilkes-Barre, Pennsylvania, office.

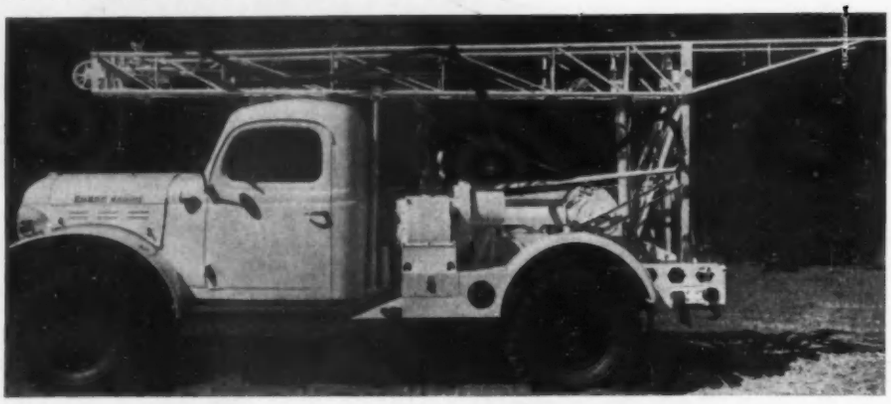
HAZARD WIRE ROPE DIVISION
American Chain & Cable Company, Inc.

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

George E. Failing Supply Company

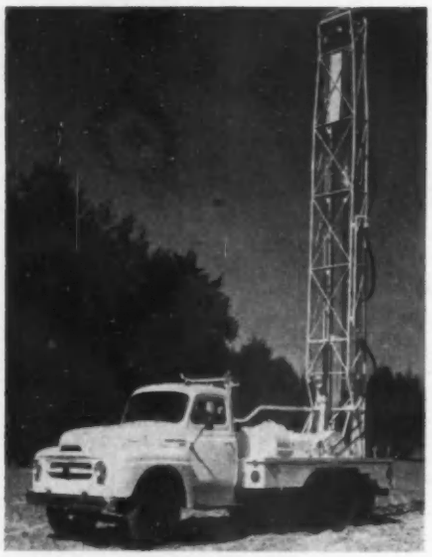
Block 10, Silver Lane

NEW PRODUCTS DISPLAYED:



The Failing CFD-2 is a pint-sized edition of the CFD-1. This rig was designed for fast shot hole work in remote or swamp areas where transportation to and from the drilling site is a major problem. The CFD-2 is for holes to 350 feet.

Circle No. 210 on Postcard, Page 315



The Failing CFD-1 has a hydraulic chain feed and is designed especially for fast shot hole drilling. The feed chains are actuated by two hydraulic motors, operating through guarded chain drives to an equalizing jackshaft, assuring even tension. The motors free wheel while pulling up for spudding or rod connections. The entire feed mechanism is controlled by a single lever. The rated capacity of this rig is 1000 feet.

Circle No. 211 on Postcard, Page 315

Oil Center Tool Co.

Booths 11 and 12, Oklahoma Building

NEW PRODUCTS DISPLAYED:

A New Casing Head, companion piece to the "C-19" Casing Head, has been introduced. The new head is a medium duty version of the "C-19" for use on medium depth wells.

Circle No. 212 on Postcard, Page 315

A New Packer is available which eliminates the common causes of packer failures at four critical steps. The new packer runs in without difficulty, sets without difficulty, holds pressure without failing, and pulls without difficulty.

Circle No. 213 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

JE and Dual Flow Controls; API Flanges; Casing and Tubing Heads.

Indian Drilling Mud Corporation

Booth 36, Kansas Building

NEW PRODUCTS DISPLAYED:

Indian Acid Soluble Drilling Mud was developed for lime formations to eliminate blockage. Proven acid solubility range from 78 to 98 percent in use in Rocky Mountain, Kansas and North Texas areas. The drilling mud has about the same gel characteristics and viscosity as bentonite but gives a thinner, tougher wall cake and lower water loss than bentonite due to better particle size distribution. When used in drilling of lime pay, the addition of acid to the cake liberates a gas through a chemical reaction. This, in turn, helps to flush the porosity of any solids that are not acid soluble.

Circle No. 214 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Indian Hi-Vis-Gel; Indian Crevice Seal; and Indian Selofane Flakes.

Schield Bantam Company

Block 205, North Area

NEW PRODUCTS DISPLAYED:

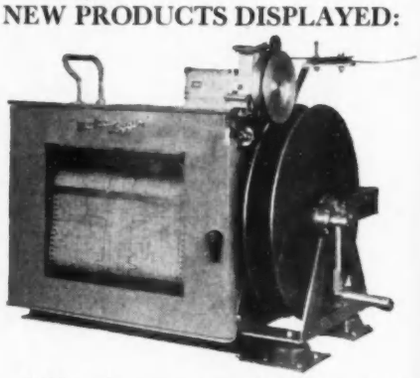
The BANTAM C-25 (Crawler) and the Bantam T-35 (truck mounted) Crane-Shovels feature power boom hoist for both raising and lowering boom under power, anti-friction bearings, larger clutches and brakes, heat treated gears and a sturdy trunnion base with four oversize trunnion rollers and four adjustable cam-type hook rollers. A remote control unit has been developed for the truck-mounted model, eliminating the necessity of having an extra man to drive. Both models can be equipped with any of eight fast-change attachments to unload pipe, fittings, handle pipe stringing, excavating and steel erection. For cross-country jobs requiring a mobile rig to handle pipelining or excavating, the truck-mounted models are best. For jobs in a permanent location or in softer ground conditions where greater flotation is required, the crawler models are more desirable.

Circle No. 215 on Postcard, Page 315

Well Instrument Developing Company

Booths 24 and 25, Scientific and Technical Building

NEW PRODUCTS DISPLAYED:



Widco Loggers are designed to give automatic, accurate and simple electric logging equipment which can be operated by exploration crews, geologists, water well contractors, and other users of electric logs. These instruments are compact, rugged, and light, so that they can be transported easily even when no roads are available for trucks or passenger cars. They are entirely self-contained and no other equipment is needed for their operation.

Circle No. 216 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Complete Line of Instruments for the Logging of Deep Holes as well as for the Logging of Very Shallow Shot Holes.

Spang and Company

Booths 44-45, 60-61, California Building

NEW PRODUCTS DISPLAYED:

A 48-inch Reamer-Type Pilot Bit of the kind used for the drilling of mine vents and escape shafts, drills a pilot hole to the desired depth. Then the next size Reaming bit is used to ream the hole. The cuttings drop into the pilot hole until it is filled to the point of operation, after which the reaming bit is laid down and the pilot string is again run to clean out to the bottom. Reaming bit is again run until the hole fills up when the clean-out operation is completed, this procedure being followed until the full length of the hole has been reamed.

Circle No. 217 on Postcard, Page 315

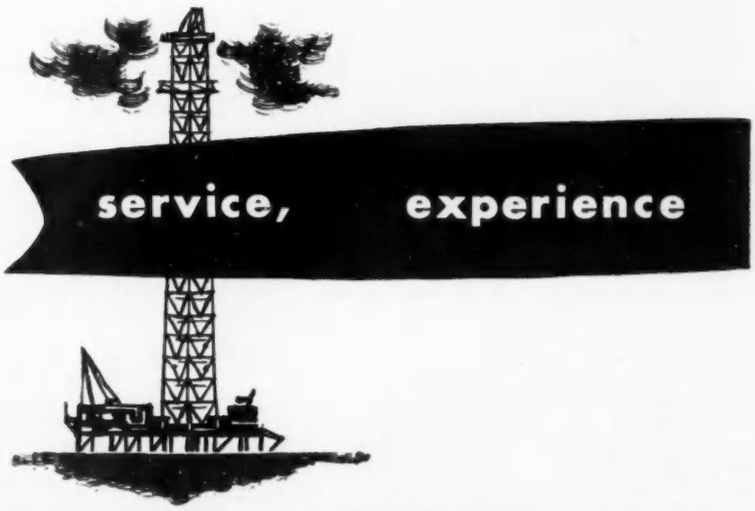
OTHER PRODUCTS DISPLAYED:

Complete Line of Cable Drilling and Fishing Tools; Boxes and Pins; Prosser Rope Sockets; Spang Weldless Jars; Six and five-eighths inch drilling bits in both carbon and alloy steel; a nine-inch blast hole bit.

SERVING the Oil Industry

Avondale's 3 PLANTS

. . . The main yard at Avondale, for ship, barge, tugboat and towboat building and repairs—and steel fabrication . . . the "Quick Repair Plant" on the Harvey Canal, for "quick turn-around" repairs, dry docking, and expert propeller work . . . the Service Foundry Division of Avondale, for expert gear-cutting and castings. All three of these facilities are conveniently located in the New Orleans area—serving the Oil Industry day and night!



AVONDALE MARINE WAYS, Inc.

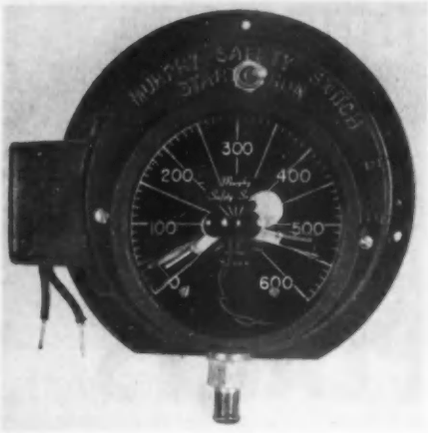
Main Yard: Avondale, La. "Quick Repair Plant": Harvey, La. Foundry Division (Service Foundry): New Orleans, La.

Post Office Box 1030, New Orleans 8, La.

Frank W. Murphy, Manufacturer

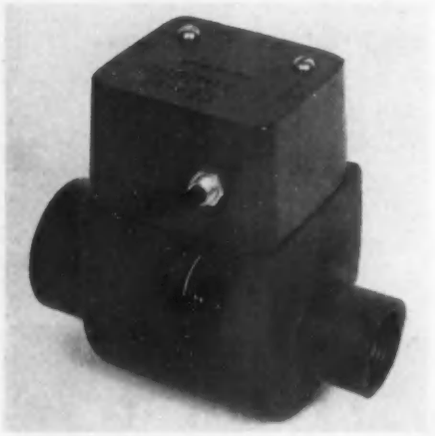
Booth 26, California Building

NEW PRODUCTS DISPLAYED:



E-45 Series Murphy Safety Switches for electric motor powered pumps and compressors combine both high and low shutdown switches in one low cost unit. One installation is required instead of the usual three for pressure gauge, low pressure switch, and high pressure switch. Visible contacts are easily adjusted through 60 percent of either high or low pressure range. Murphy Safety Switches operate by breaking holding coil circuit of magnetic starter and are available in pressure range from 30-inch vacuum to 5000 pounds pressure in four-and-one-half-inch dial size.

Circle No. 218 on Postcard, Page 315



Murphy Automatic Gas Shut-Off Valve operates on current of primary winding in magneto. Low lube oil pressure, high water temperature or time cycle switch is used as contactor to actuate valve. This valve prevents post ignition or Dieseling of today's modern high temperature engines, prevents gas leak through carburetor when engine is not running, eliminates explosion hazard, saves gas, and keeps sour gas from working on valves and other internal engine parts.

Circle No. 219 on Postcard, Page 315

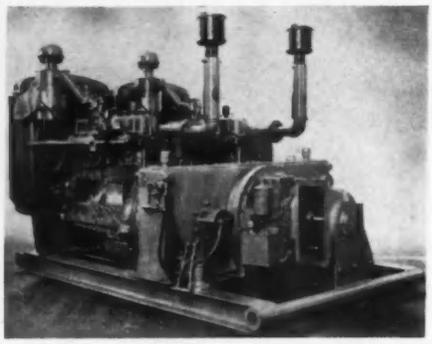
OTHER PRODUCTS DISPLAYED:

Complete Line of Fully Automatic Engine Safety Switches; Complete Line of Pressure and Vacuum Safety Shut-Down Switches; Alarms for Gas Engine Powered Pumps and Compressors.

Dresser Equipment Company, Ideco Division

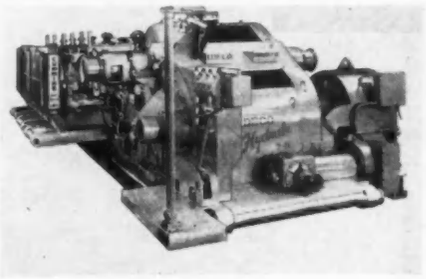
Block 11

NEW PRODUCTS DISPLAYED:



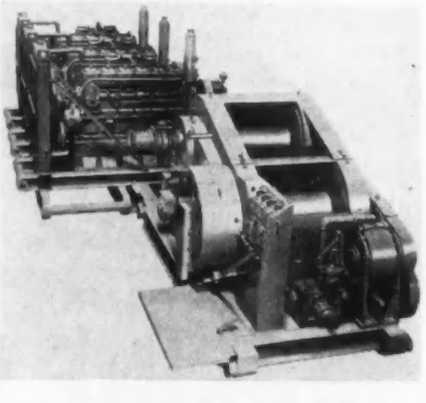
The Ideco-Waukesha Twin 145 GKBU Power Unit is designed to meet the demand for a torque converter equipped gas-butane engine in the 300 hp class. It is used on the Ideco H-35 Rambler Rig. Other applications include the use of three units to power large drilling rigs. Still other Twin units in both torque converter and mechanical drive arrangements have been used on unitized pump hook-ups.

Circle No. 220 on Postcard, Page 315



The Ideco Hydrair 7-11 Rig has been designed for a range of horsepower from 700 to 1100. Torque converter equipped, it features high flexibility of operation through fingertip air controls and air clutches, infinite speed selection plus high torque multiplication with hydraulic torque converter drives. Fully portable, the 7-11 can be rigged down into eight-foot maximum road width loads.

Circle No. 221 on Postcard, Page 315



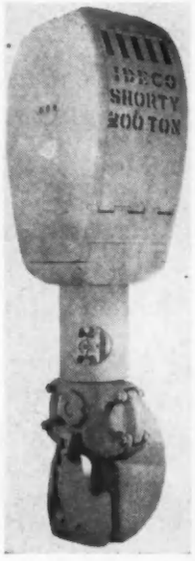
The Ideco H-750 Hydrair Hoist series drilling rigs are for drilling to 8000 feet with 4½" drill pipe when powered by two or three engines developing a total of 750 hp. They are designed to be converted easily from mechanical to torque converter rigs or from torque converter rigs to mechanical rigs, without major changes. Airflex clutches serve as flexible couplings and act as engine disconnects. The compound drive is enclosed in an oil-tight case. The pump drive is connected to the compound through an air clutch controlled from the driller's position.

Circle No. 222 on Postcard, Page 315

The Ideco Type "C" Kwik-Lift Mast is used for servicing, workover, and shallow drilling. It is designed to be transported from well to well without disassembly. The rig, a twin-column, latticed, telescoping structure, will meet most road weight restrictions. Road width is less than eight feet, and height less than 12 feet nine inches. In the over-the-road position the total mast depth is only 30 inches from front leg to rear edge of the portal girt.

Circle No. 223 on Postcard, Page 315

Full View Mast



Shorty Block

Ideco Full View Mast is available in three types, up to 143-foot height with 600,500-pound net hook capacity. The Mast is an A-frame structure held in the upright position by a pair of auxiliary legs which serve also as a part of the raising mechanism. No guys are required and no braces nor girts obstruct the driller's view of the traveling block or derrick man. Drilling floor measures 24

"PRICE" and "COST" Are Two Different Things

• The price you pay for a drilling line is no indicator of what it will cost you to use it. Some operators buy on a price basis because the original amount seems smaller. Others buy a shorter length line to keep the price down. Both of these methods of buying have cost many operators a lot of extra money. With equipment costs rising and competition keener than ever, you must find ways to cut costs.

Wire Rope Is Only Part of It

Of course, it pays to use the one best drilling line—American Cable's TRU-LAY Preformed. But that's only part of it. You must also follow certain practices that start when you order and carry through until you have run every last ton-mile from the line. The beauty of the whole plan is its simplicity and easy operation.

You Can't Afford to Pass It Up

Your nearby American Cable distributor will tell you why one of the two reels illustrated above is better for you—AND—he'll show you how you can *make it cost less.* It won't cost you anything to find out, so why wait. See him today or write our Wilkes-Barre office.

ACCO **See us at Booth 173 • Tulsa Oil Show**

makers of ACCO Registered WIRE ROPE SLINGS

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

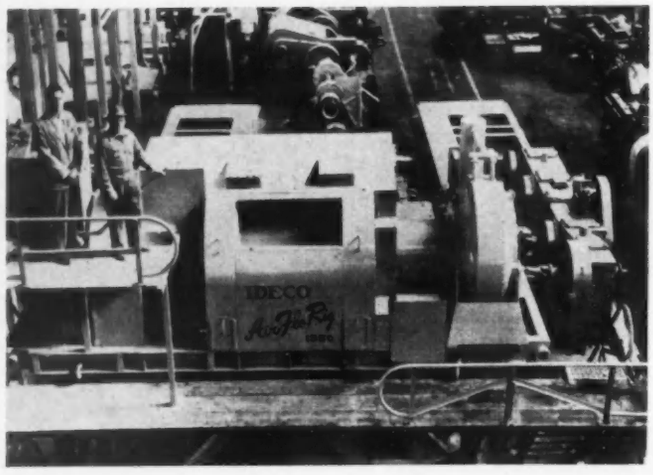
Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

feet from drawworks to pipe ramp and 27 feet, eight inches from side to side.

The Ideco 200-ton Shorty Blocks are unitized assemblies which combine the block, spring loaded link adapter, and swivel bail hook into a short, compact assembly. Added head room provided by this design permits faster operation as the pipe may be hoisted safely at full speed to to the top of the run. The 200-ton capacity model, with an hydraulic cushion return that eliminates snap and jar of the hook, has 36-inch Fabriform sheaves, which are dynamically balanced for smooth operation.

Circle No. 224 on Postcard, Page 315

The Ideco 1350-S is the largest torque converter equipped drilling rig in the world. The giant rig features a console control panel with fingertip air controls that will put over 1785 hp to work on a drilling operation. The rig consists of drawworks, transmission, two dual engine compounds, and an unusual catwalks and console-type control panel, which is complete with engine temperature pyrometers, tachometer, engine clutch controls, oil and fuel pressure and rig brake control.



Circle No. 225 on Postcard, Page 315

The Ideco H-35 Hydrair Hoist is a one- or two-engine 350 hp rig. Its equipment includes air clutches on high and low speed drives to main drum; torque converter drive; oil bath for all chain drives; large brakes; hydromatic brake engaged by direct air clutch; and pressure lubrication of all shaft bearings. The H-35 series is rated for drilling to 5000 feet with 4½" drill pipe, and for workover and servicing to 13,500 feet. A special deep well workover and servicing H-35 model is available for workover and servicing to 16,400 feet.

Circle No. 226 on Postcard, Page 315

Hyatt Bearings Division

General Motors Building, Block 10

PRODUCTS DISPLAYED:

Hyatt Roller Bearings and their application to pumping units, rotaries, blocks, engines, pumps and drawworks.

W. L. Walker Company

Outside Front of Technical Building

NEW PRODUCTS DISPLAYED:

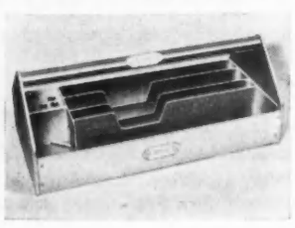
The new Walker Strapping Pole helps tank strapper scribe tanks and string strapping lines on any sizes of tanks from the ground. Its head has a button to hold the strapping line ring so it may be carried around the tank. The line can be placed in the open link and the strapper walks around the tank guiding the strapping line on to the scoring marks. There are two holders on the pole, one to hold a brass guide, the other chalk, which enable the strapper to set off the distance from the tank seams and scribe the tank from the ground.

Circle No. 227 on Postcard, Page 315

The Walker Tulsa Oil Thief, constructed entirely of spark-proof brass tubing and bronze castings, has an I-beam construction of the closer arm, which holds the valve and prevents bending. Thus, the valve is always in line with the seat. The valve plate rotates as it is opened and closed. It stays ground in with the valve seat to assure a perfect seal. A ball socket seats the valve plate. A trip rod can be used to trip the thief automatically when it strikes the tank bottom or it may be set to hold the thief at any distance off bottom.

Circle No. 228 on Postcard, Page 315

Walker Gaugers' Equipment Case is made entirely of aluminum which is spark-proof, rust-proof and light weight. The tray is divided, giving a compartment for each piece of equipment which increases efficiency and reduces breakage.



Circle No. 229 on Postcard, Page 315

The Walker Hydrometer Case is a dual case of rectangular shape lined with thick wool felt. Unique safety latch prevents accidental opening, yet insures easy opening. Hinges are integral part of case and last indefinitely. A triple case of cigar case design makes hydrometers readily accessible. Stems of hydrometers are protected by sheepskin, the bases by felt. This case, too, features the special safety latch and cast hinges.

Circle No. 230 on Postcard, Page 315

The Walker Gauging Reel, simple to operate, can be run at any desired speed, then stopped instantly by a trigger-controlled automatic braking action which greatly reduces danger of injuring the gauger's hand. Built-in, trigger-controlled neoprene pads wipe the tape saving rags and keeping tank deck clean.

Circle No. 231 on Postcard, Page 315

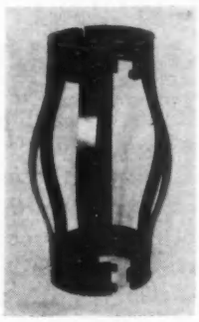
The New Walker Centrifuge Machine Model 12.5 is a compact, six-volt machine developed for the field gauger. Featuring a combined rheostat and switch with safety pilot light to protect the car battery, it measures accurately the B. S. and water content of crude oil. Speeds are adjustable up to 2450 rpm. Six volts and 5½ amps make it easy on the car battery. A direct drive to the tube head eliminates bearings and reduces maintenance.

Circle No. 232 on Postcard, Page 315

Larkin Packer Company, Inc.

Booths 50 and 51, Oklahoma Building

NEW PRODUCTS DISPLAYED:



Short Type

Long Type

Lok-On Casing Centralizers in their spring design, both in the double bow and single bow types, provide the extra high-centering force at low deflections with a minimized loss of bowed-height after repeated deflections. The design of the end rings provides strength plus ease of installation around couplings or welding lugs. These centralizers are furnished in three ranges to provide efficiency in all ranges of hole sizes.

Circle No. 233 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Float Shoes; Float Collars; Guide Shoes; Cementrol Float Shoes; Cementrol Float Collars; Cementrol Swivel Adapters; Casing Centralizers; Casing Heads; Tubing Heads; Casing Spiders; Bull Plugs; Swage Nipples; Packers.

Reynolds Metals Company

Booths 95-98, Oklahoma Building

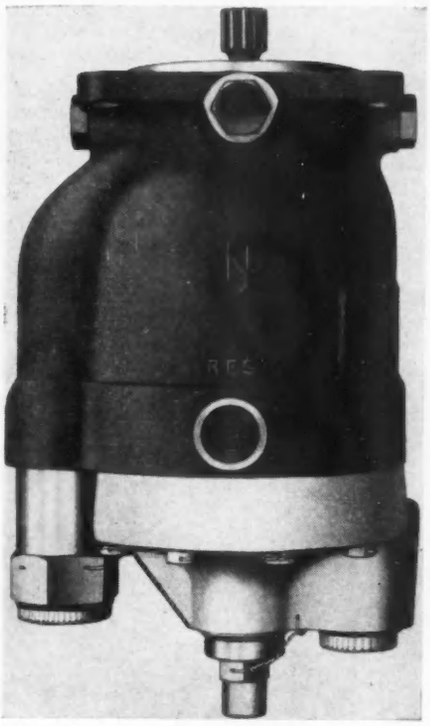
PRODUCTS DISPLAYED:

Aluminum Pipe and Welded Parts; Insulation Jacketing; Heat Exchanger Tubing; Instrument Air Tubing; Pastes and Pigments for Paints and Roof Coatings; Basic Chemicals; Drums and Electrical Conductor; Reynolds Aluminum Industrial Roofing, Siding, and Other Building Products.

New York Air Brake Company

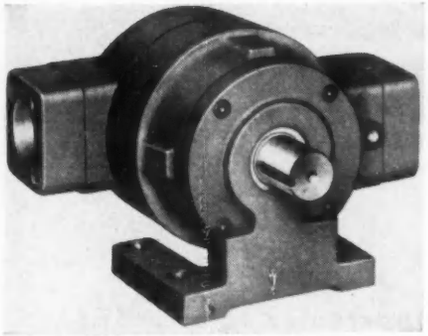
Booths 84N and 85N, North Area

NEW PRODUCTS DISPLAYED:



The Stratopower 66 W Series Pumps have hydraulic control applications in oil field and refinery. This series having capacities of 2, 3, and 6 gallons per minute represents a contribution to hydraulic power in the 3000 pounds per square inch range. The new 66 W series is of the variable delivery type with advance design radial piston construction providing advantages in operation and maintenance.

Circle No. 234 on Postcard, Page 315



DUDCO Vane Type Pumps and Motors are for problems of hydraulic power in the 2000 psi category and have many applications where an explosion-proof drive is indicated. The exclusive Dual Vane design and diametrically opposed arrangement of inlet and ports to provide constant balance of load are two of the many features in DUDCO pumps and motors.

Circle No. 235 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Hydreco Gear Type Pumps, Motors, Valves and Cylinders; Aurora Centrifugal and Turbine type Deep Well, Sump and Industrial Water Pumps; Kinney Herringbone Gear and Rotating Plunger Liquid Handling Pumps and Kinney High Vacuum Pumps.

McGill Manufacturing Company

Booths 83 and 84, Texas Building

NEW PRODUCTS DISPLAYED:

The new Guiderol Bearing eliminates roller skewing in any mounting from horizontal to vertical. The outer race of this bearing is constructed with an integral guide rail and rollers grooved for this rail are held in place during mounting by a retaining ring that is snapped over the rollers into the roll groove. Right angle alignment of the rollers to their direction of travel is automatically maintained by momentary rail and roller groove contact when a tendency to skew arises. Elimination of all endwashers allows free circulation of oil through the bearing and permits the use of extra long rollers giving support to the full width of the races.

Circle No. 236 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Complete Line of Bearings including CF Series Multirol Full Type Roller Bearings.

Subsurface Engineering Company

Booth 23, Scientific and Technical Building

PRODUCTS DISPLAYED:

Graphs and Descriptive Matter Showing Results Obtained for the Following Tests: Static Bottom Hole Pressure Test, Flowing Bottom Hole Pressure Test, Productivity Index Test, Drawn Down Test, Build Up Test, Valve Check Test, Packer Leak Test, Open Flow Capacity Test, Various Temperature Surveys, Gas-Oil Ratio Test.

J. H. Williams & Co.

Booth 27 and 28, Park Lane

PRODUCTS DISPLAYED:

Chain Pipe Tongs and Vises; Box Wrenches; Adjustable Wrenches; Open End Wrenches; Spud Wrenches; Construction and Structural Wrenches; Striking-Face Box Wrenches; Detachable Sockets and Drivers; Impact Sockets; Pliers; Screw Drivers; Punches; Chisels; Tool Sets in Metal Chests; "C" Clamps; Tool Holders and Set-Up Accessories; Hoist Hooks; Eye Bolts; Custom Drop-Forgings.

Macwhyte Company

Booths 130-131, Oklahoma Building

PRODUCTS DISPLAYED:

Rotary Lines; Cable Tool Lines; Casing; Core Barrel Lines; Special Macwhyte Braided Wire Rope Slings; Stainless Steel Wire Rope; Monel Metal Wire Rope; "Safe-Lock" Cable Assemblies; Special Wire Rope Parts.

Koppers Company, Inc.

Booths 73, 74, and 75, Texas Building

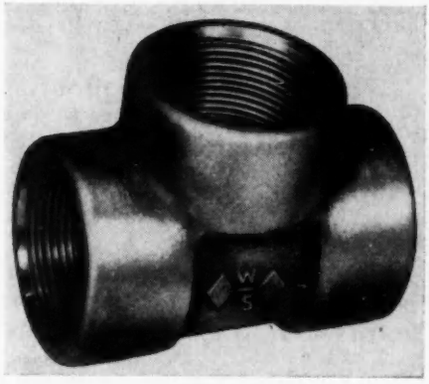
PRODUCTS DISPLAYED:

American Hammered Piston Rings, Bitumastic Pipe Line Enamels, Bitumastic Industrial Coatings, Fast's Couplings, Aeromaster Industrial Fans.

Watson-Stillman Fittings Division, H. K. Porter Company, Inc.

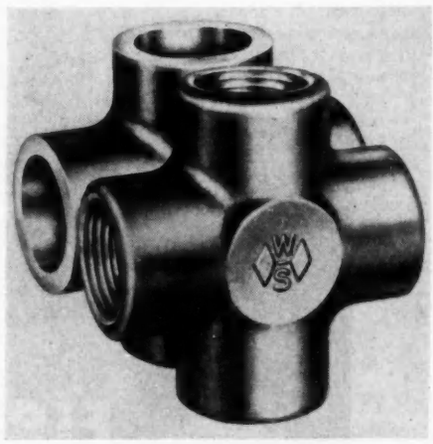
H. K. Porter Company Building, Drake Drive

NEW PRODUCTS DISPLAYED:



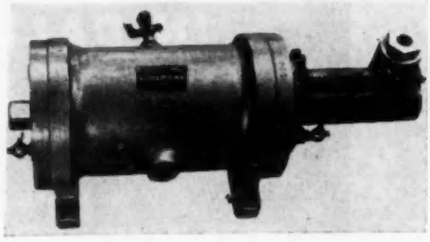
Forged Steel Pipe Fittings include screwed and socket welding types. The screwed type, for 2000-3000-6000 pounds pressure, are available in stainless, carbon and alloy steels in sizes from one-eighth to four inches. Socket welding type, available in the same sizes, are for 40-80-160-XX Pipe and are available in stainless, carbon and alloy steels.

Circle No. 237 on Postcard, Page 315



"Featherlite" Forged Stainless Steel Fittings are a new lightweight line of fittings in sizes of from ⅛ to 1 inch availble in screwed and socket welding types.

Circle No. 238 on Postcard, Page 315



Portable Air Engine Pump is used wherever pressure is needed. Pump discharge capacities 2000, 4000 and 6000 pounds per square inch. The pump operates on a single connection to stationary or a portable compressor.

Circle No. 239 on Postcard, Page 315

AHEAD OF THE CAT CRACKER

First there's financing by the FIRST in Dallas

the Southwest's Pioneer Oil Bank

FIRST NATIONAL BANK IN DALLAS

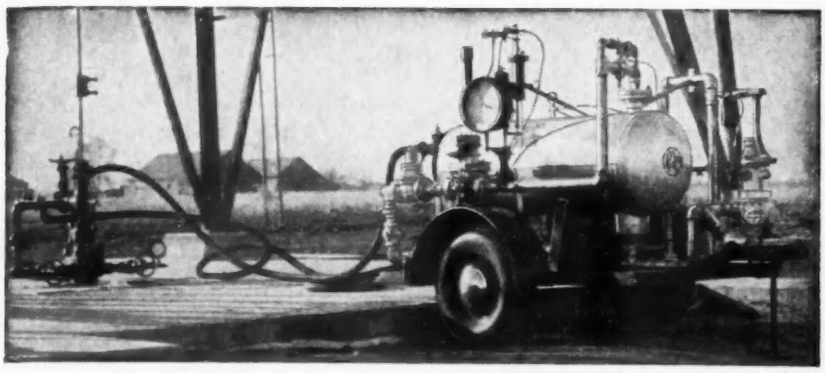
MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Give us an opportunity to say YES

Rolo Manufacturing Company

Block 5

NEW PRODUCTS DISPLAYED:



New Developments in Well Testing Units include Wellcheckers in new models to handle very small production rates as well as large units to handle large production rates. All Wellcheckers separate oil and gas and meter each phase accurately. A new optional accessory feature separates, removes, and meters all free water produced. Rolo's new free water knockout units are for use for high water producing wells which produce little or no gas. These units separate and meter oil and free water, are available in a variety of sizes on either trailer or skid bases, and are especially recommended as test units for water flood areas.

Circle No. 240 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Oil and Water Meters; Automatic Samplers; Rolo CV Liquid Level Controls; Well Testing Equipment Items.

Whitmor Homebuilders, Inc.

Booth 35, Park Lane

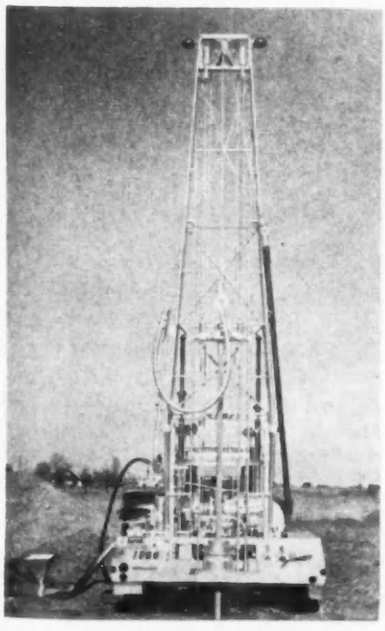
NEW PRODUCTS DISPLAYED:

Model 944 Whitmor Distinctive Field Home, with attached garage, features six rooms, enclosed utility room, forced air heating and tile bath. Among the nationally advertised products used in Whitmor homes will be Youngstown Steel Kitchen Cabinets, Long-Bell mill work, Texaco roofing, Certain-Teed asbestos products, DuPont paints, and Schlage hardware.

Circle No. 241 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Entire Line of Housing; Recreational Facilities; Utility Services; "Osage" Model Field Home erected one block from booth.



The Winter-Weiss Company

Block 201, North Extension

NEW PRODUCTS DISPLAYED:

A New Model Portadrill for shot holes, underground exploration, coring, blast holes or test holes designed for both air-blast drilling and conventional operations is a single unit rig with an interchangeable mud pump and 600 cfm air compressor. This model Portadrill has a rated capacity of 400 feet of six-and-one-quarter-inch hole when operating as an air-blast drill or 1500 feet of eight-inch hole under conventional operations. It is a completely unitized rig, two-man operated with safety features common to all Portadrill models.

Circle No. 242 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Portadrill Model 500 HD Seismic Rigs; Portadrill Model 501 for Shallow Oil Wells; Water Wells or Hoes to 2000 feet deep; Portadrill Reverse Circulation with Rated Capacity of 60-inch Diameter Holes.

Schramm, Inc.

Block 207 and Booth 86N

PRODUCTS DISPLAYED:

Portable Engine-Driven Compressors; Self-Propelled Pneumatractor; Compressor-Tractor Combination; Sky Worker; Pneumatractor Equipped with Back Hoe, Front End Loader, Auburn Trencher; Twin Boom Pipe Line Drill.

Shafer Bearing Corporation

Booths 83 and 84, Texas Building

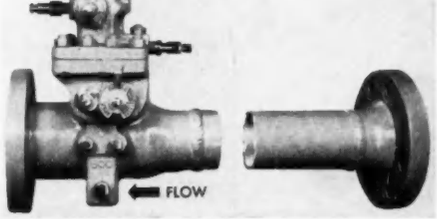
PRODUCTS DISPLAYED:

ConCaVex Bearings; Self-Aligning Bearings; Pillow Blocks; All Types Industrial Bearings; Aircraft Bearings.

Daniel Orifice Fitting Company

Booth 39, Scientific and Technical Building

NEW PRODUCTS DISPLAYED:



Daniel "Flangnek-Senior" Orifice Fitting and Meter Run Combination prevents misalignment and other possible errors in field installations. Upstream tube is welded to the fitting by a special factory process which guarantees positive alignment of tube and fitting plus a smooth interval weld joint. Flanged fitting outlet and a flange at the outer end of the upstream tube permits quick, easy removal from the line for inspection and cleaning. Accurate alignment of the downstream tube is assured by dowel pin flange alignment holes for 150 and 300 pound ASA flanges, and by matching male and female faces for all higher ASA ratings.

Circle No. 243 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

30" Senior Orifice Fitting; Junior Orifice Fitting; Simplex Orifice Plate Holder; Orifice Plates; Piston Controlled Check Valves; "Throttleseal" "O" Ring Valves; Orifice Meter Leveling Saddles; Bombs.

Peen-O-Graph Corporation

NEW PRODUCTS DISPLAYED:

Peen-O-Graph's Fully Mobile Shot Peening Rig is designed to shot peen both the exterior and interior of drill pipe at any location. It is claimed that shot peening increases the life of the pipe, prevents and removes corrosion, increases the strength of the joints, and helps prevent pipe failure. Peen-O-Graph states their intention is to increase the life and efficiency of drill pipe, and that bad joints or fractures are not cured by their method, but are recorded to allow the bad joints to be discarded.

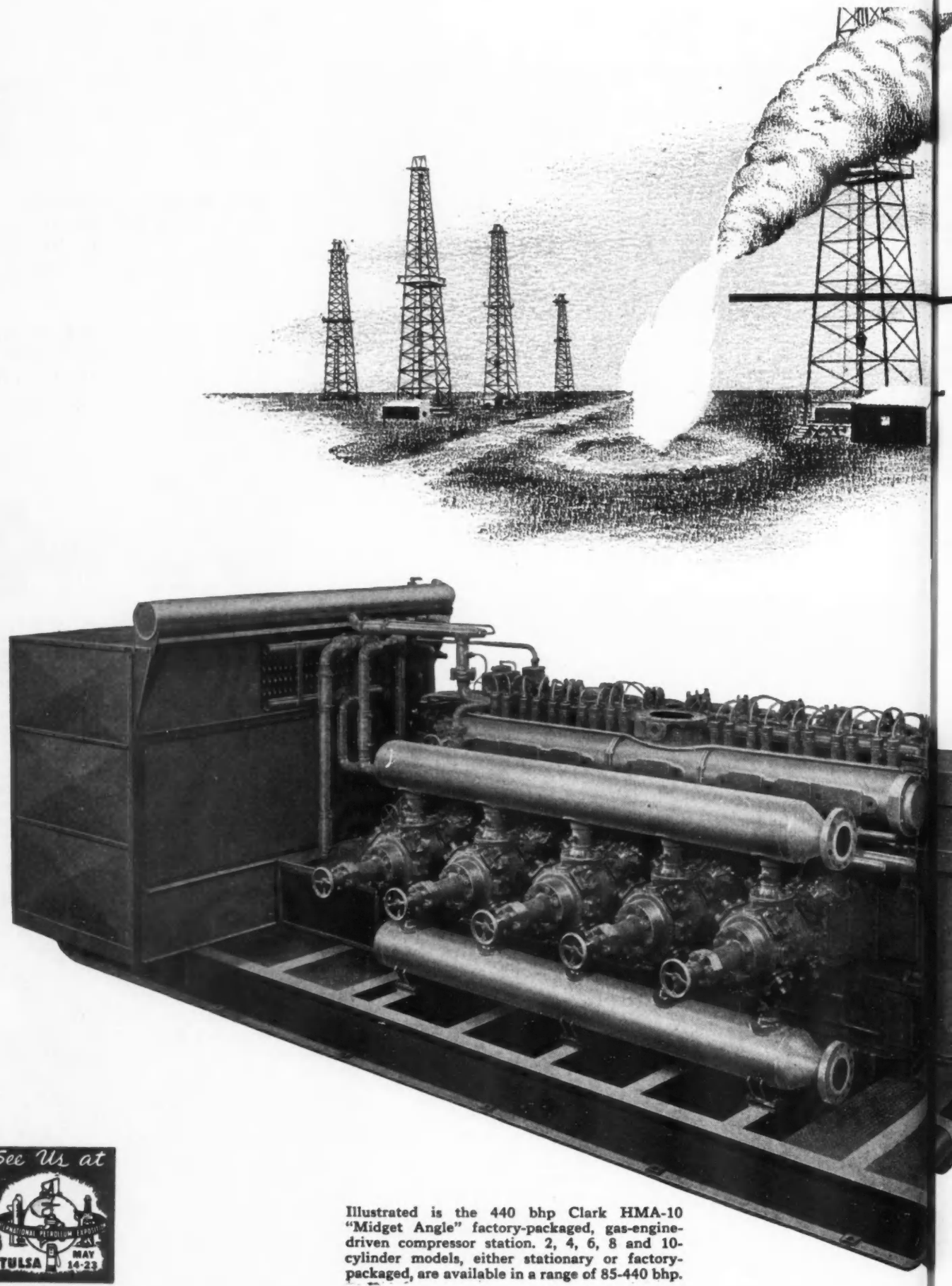
Circle No. 244 on Postcard, Page 315

Peerless Mfg. Co.

Booths 215 and 216, Oklahoma Building

PRODUCTS DISPLAYED:

Transparent Plastic Separator with automatic controls.



Illustrated is the 440 bhp Clark HMA-10 "Midget Angle" factory-packaged, gas-engine-driven compressor station. 2, 4, 6, 8 and 10-cylinder models, either stationary or factory-packaged, are available in a range of 85-440 bhp.

© 1953, Clark Bros. Co., Division of Dresser Operations, Inc.

FLARE GAS...

waste or profit?

whether you inject it, sell it or process it
Clark "Midget Angles" quickly turn it into profits

Are you burning flare gas, or are you limiting your production because of inadequate compressor facilities to take care of it?

Either way, you are losing dollars which could *quickly* be turned into profits with a Clark "Midget Angle." It will pay for itself in *less* than a year!

Completely factory-packaged compressor stations, Clark "Midget Angles" are ready to go to work the day you receive them. Radiators, scrubbers, starting equipment—*everything* is built-in. No excessive delays or outlays for elaborate foundations and buildings. Only a slab of concrete and a simple roof are needed.

Perfect balance, a tough, rugged design, precision construction throughout — these are the Clark features that assure dependability and long life. You don't have to "baby" or pamper a Clark Midget Angle!

Performance-proved by over 600 field installations throughout the world, the Clark Midget Angle is the most practical compressor within its horsepower range for: field gas gathering, gas lifting, repressuring, flare gas elimination, recycling plant feeders, pipeline testing and many other uses. Your Clark representative will give you the facts and figures. Write for Bulletin 126.

CLARK BROS. CO. • OLEAN, N. Y.

DIVISION OF DRESSER OPERATIONS, INC.

SALES OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

PRECISION BY THE TON

CLARK compressors

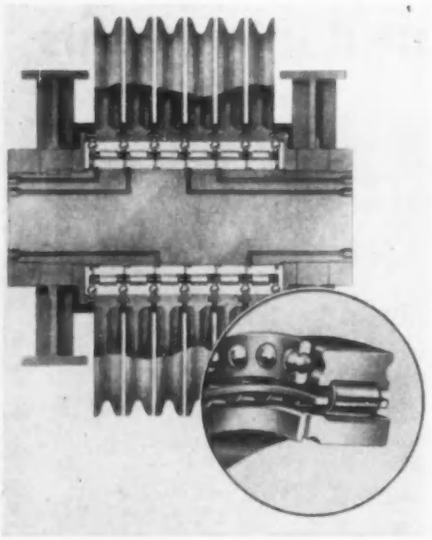
Aetna Ball & Roller Bearing Company

Booths 83-84, Texas Building

NEW PRODUCTS DISPLAYED:

The Aetna Patented Crown and Traveling Block Bearing is a combination ball thrust and radial roller bearing which is claimed to overcome the long-recognized deficiency in bearings of the conventional-type normally used in block applications. The combination bearing utilizes a design principle whereby the imposed loads are divorced from each other into pure thrust and pure radial. This is accomplished by the incorporation of a ball thrust bearing between each pair of radial roller bearings, the outer rings of which are made to act as dual-purpose races, serving as paths for both balls and rollers.

Circle No. 245 on Postcard, Page 315



The Aetna Angular Contact Rotary Table Main Bearing is of the angular contact type and is made in sizes up to 38 inches outside diameter. It employs balls three inches in diameter and has a load capacity of more than 200 tons. The balls are of chrome steel and are keyed into a solid bronze retainer. The races are made from special analysis steel forgings which, after machining and before grinding, are case hardened to obtain the hard, wear-resistant surface and tough, elastic, shock-absorbing core so important in bearings assigned to this rugged application.

Circle No. 246 on Postcard, Page 315

Ampco Metal, Inc.

Booths 32, 33, 34, California Building

NEW PRODUCTS DISPLAYED:

Ampco Polished Rod has a high tensile strength and yield strength necessary for trouble-free performance under rugged applications. The hot working of the extrusion process imparts a dense, homogeneous grain structure with improved physical properties. The inherent bearing qualities and mating characteristics of Ampco bronze give improved service at points of wear. Excellent resistance to corrosion, erosion, shock and abrasion make Ampco polished rod ideally suited for use in units pumping sour crude.

Circle No. 247 on Postcard, Page 315

Ampco Tubing possesses excellent physical properties and outstanding corrosion resistance. Tubing is produced to dimensional tolerances of Spec. ASTM-A-269 (stainless steel) which calls for a nominal wall rather than a minimum wall thickness, a weight saving of approximately 10 percent. Ampco Grade 8 is allowed 8000 psi design stress at 500° F. and at —420° F. retains a high percent of impact strength.

Circle No. 248 on Postcard, Page 315

Ampco Seamless and Welded Pipe give excellent service for highly corrosive and erosive applications. Ampco Seamless Pipe is extruded from one-half to four-inch diameters. Wall section tolerances, weight and concentricity are in accordance with Iron Pipe Sizes (IPS). Ampco Seam welded pipe fabricated from Ampco sheet and plate is supplied when diameters are over four inches.

Circle No. 249 on Postcard, Page 315

Ampco Pipe Wrenches are spark-resistant and feature replaceable jaw inserts made of Ampco beryllium copper. This redesigned wrench eliminates the need of purchasing an entire new upper jaw when teeth become worn. The same insert can be used in either upper or lower jaws. Complete wrenches are available in sizes from 8 to 48 inches.

Circle No. 250 on Postcard, Page 315

Ampco Chain Pipe Wrenches provide protection in hazardous locations where sparks may cause disaster. Jaws are made of Ampco beryllium copper and are reversible. Having excellent gripping ability, this wrench is available in a complete range of sizes for pipe with diameters for ⅛-inch to 12 inches.

Circle No. 251 on Postcard, Page 315

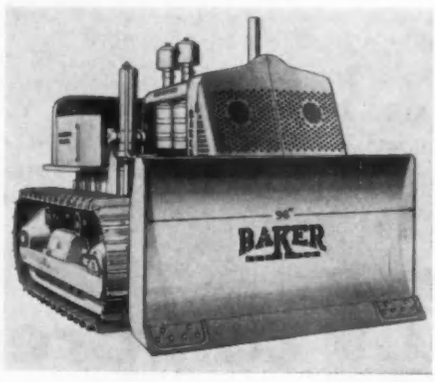
Ampco (Aluminum Bronze) Fittings are resistant to corrosion, erosion, and cavitation-pitting. Ideally suited for high-temperature, high-pressure systems, these fittings are made in a complete range of pattern sizes and types.

Circle No. 252 on Postcard, Page 315

Allis-Chalmers Manufacturing Company, Tractor Division

Blocks F and 201

NEW PRODUCTS DISPLAYED:



The new Baker hydraulic "no-push-beam" bulldozer is designed so that it becomes integral with the 109 hp, 27,850-pound HD-15 crawler tractor. It is especially adapted for oil field work in the digging of slush pits, readying drilling sites, clearing land, building and maintaining haul roads, cleaning up, and other jobs. Transportation on the highway is unusually easy because the 96-inch wide blade is the same width as the standard highway trailer. This eliminates the necessity of obtaining a special permit for transporting the unit on the highway.

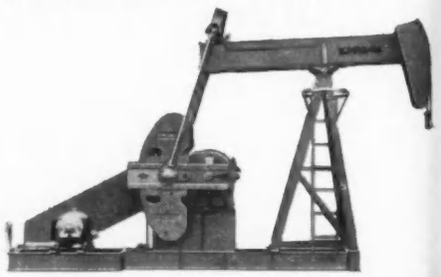
Circle No. 253 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Model HD-20, 175 net engine hp, diesel-powered hydraulic torque converter crawler tractor with Tractomotive side boom; Model HD-9X, 72 hp, diesel-powered crawler tractor with Baker "no-pushbeam" hydraulic bulldozer and Tractomotive ripper; Model HD-9, 72 hp diesel-powered crawler tractor with Gar Wood bulldozer and winch, and headache rack; Model HD-5G, 40 hp diesel-powered crawler tractor with Tracto-Shovel, and Tractomotive ripper on rear; Model AD-40, 104-hp diesel-powered motor grader with scarifier and canopy top; Model D, 50 hp gasoline-powered motor grader with rear-mounted Tractomotive loader; and Model IB industrial wheel tractor with loader and mower.

American Manufacturing Company of Texas

NEW PRODUCTS DISPLAYED:



American's New "A" Series Pumping Units feature the adjustable counterbalance crank. One man can easily adjust the unit counterbalance by simply loosening two bolts that hold each master weight in position and turning the acme screw that moves the weight to the desired position on the crank. These cranks are also available without the acme screw; the weights can then be moved with a pry bar. These new American units have a calibrated crank, which makes it possible to adjust the counterbalance to the exact predetermined amount. Pocket-type weights can be added to the back side of the master weights to give maximum counterbalance. These pumping units are also equipped with newly designed saddle bearing assemblies, wrist pin bearing assembly, and equalizer bearing assembly.

Circle No. 254 on Postcard, Page 315

Anchor Coupling Company, Inc.

Booth 69, Texas Building

NEW PRODUCTS DISPLAYED:

The New Female Swivel Reusable Coupling with JIC threads for the one wire braid cotton cover hose which is most generally used in the oil fields.

Circle No. 255 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Complete Line of Reusable Hose Couplings, Hose Assemblies, and related fittings, for the oil drilling, producing, refining, liquefied petroleum gas industries and fittings for high, medium and low pressure industrial hydraulic applications.

VISIT IVERSON at the OIL SHOW

IVERSON GENERAL OFFICES
400 WEST FIFTH STREET — TULSA

VIEW OF EXPOSITION GROUNDS
88-89-90 KANSAS BUILDING IVERSON OIL SHOW DISPLAY

IVERSON SUPPLY CO. · OIL WELL SUPPLIES ·

When you are in Tulsa for the Oil Show, we will appreciate seeing and visiting with you. As many of our field and store personnel, as can be spared, will also be here and they will want to see you again. Since our General Headquarters are in Tulsa, perhaps we can be of help in performing some service for you. Please feel free to call on us.

STORES: Artesia and Farmington, New Mexico; Oklahoma City, Okmulgee and Tulsa, Oklahoma; Kermit, Odessa and Snyder, Texas and Price, Utah.

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TULSA MAY 14-23

OFFICES: FORT WORTH, TEXAS

IVERSON SUPPLY COMPANY

DRILLING-PRODUCTION AND REFINERY EQUIPMENT
P. O. BOX 1439 TULSA 1, OKLA.

OFFICES: MIDLAND, TEXAS

Air Reduction Sales Company A Division of Air Reduction Co., Inc.

Booths 30 to 33, Oklahoma Building

NEW PRODUCTS DISPLAYED:

An Automatic Heliweld Hardfacing Unit is an improved method for depositing tungsten carbide hardfacing material on tool joints for well drilling rigs. It uses the standard Automatic Heliweld Head and a unit for feeding the bulk tungsten carbide. The manner of deposition of loose, granular, pure tungsten carbide particles minimizes reduction of particle size by solution of the tungsten carbide into the base metal. It also minimizes the heat-affected area adjacent to the deposit. In operation, the Heliweld arc melts the base metal, producing an elongated pool and the tungsten carbide particles are poured into this pool behind the arc. The rate of tungsten carbide feed from the Vibratory Hopper mounted on the Automatic Heliweld Head is electrically controlled with a high degree of accuracy.

Circle No. 256 on Postcard, Page 315

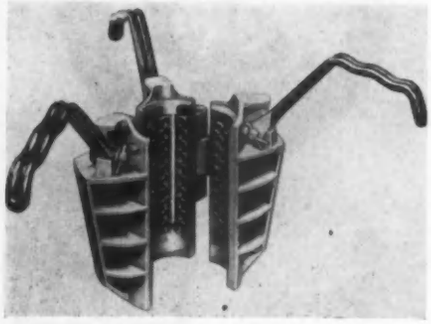
OTHER PRODUCTS DISPLAYED:

No. 6B Oxygraph cutting machine; Aircomatic welding; DC Bumblebee arc welding machine; Hornet 36A arc welding machine; Miscellaneous torches, regulators and hardfacing equipment.

Abegg & Reinhold Company

Mid-Continent Supply Bldg., Block 3

NEW PRODUCTS DISPLAYED:



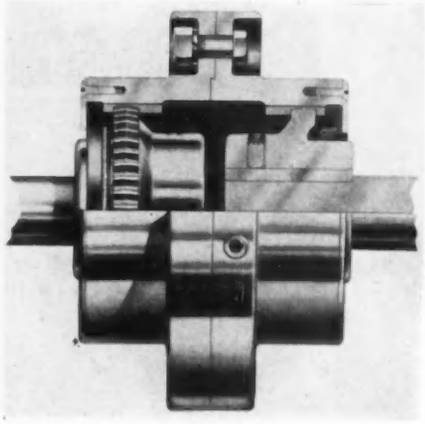
The New Varco Champion Type SCB Rotary Drill Pipe Slip, designed for in excess of 10,000-foot drilling, is of rugged yet light construction. The patented circular buttons leave only a light round impression on the drill pipe. Each individual circular button has sufficient play to adjust itself around the drill pipe so that all buttons come into even grip and carry their share of the total load. These lightweight slips consist of three alloy steel, heat-treated segments joined together by two forged hinge blocks. The circular buttons can easily and quickly be replaced by simply moving the retaining ring at the top of each segment, sliding out the buttons, inserting the new ones and replacing the retaining ring.

Circle No. 257 on Postcard, Page 315

Ajax Flexible Coupling Co., Inc.

Block 208

NEW PRODUCTS DISPLAYED:



Ajax new dihedral couplings are specially designed to handle misalignment between direct-connected machines heretofore considered excessive. Backlash is held to lubricant film requirements. All gear teeth are hardened to 55 Rockwell C.

Circle No. 258 on Postcard, Page 315

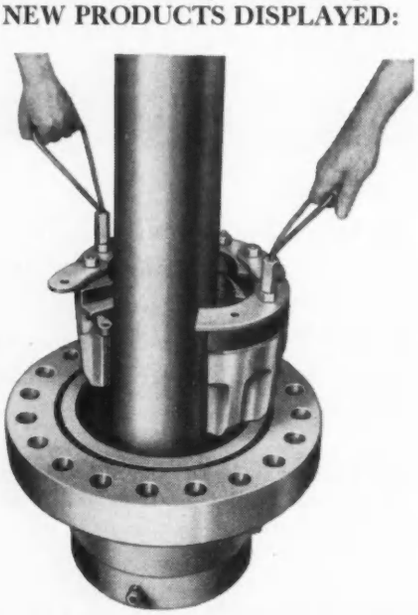
OTHER PRODUCTS DISPLAYED:

Ajax Rubber-Bronze Bushed Couplings; Ajax Neoprene Bushings; Graphited Bronze Bearings.

Baash-Ross Tool Company

Booths 25, 26, and 27, Texas Building

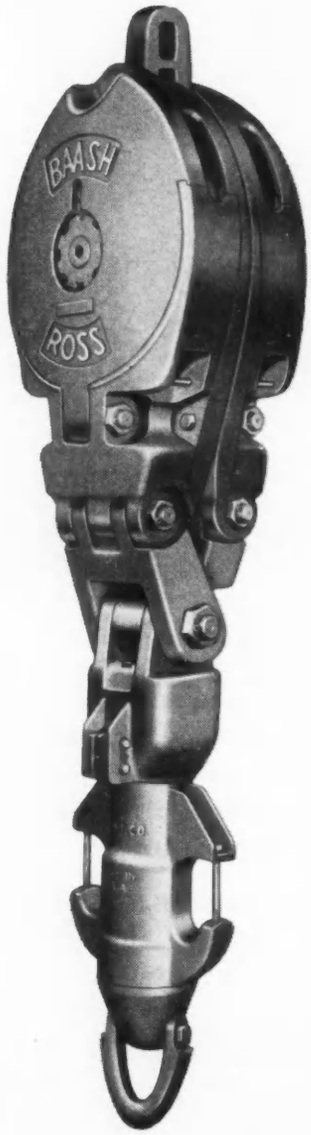
NEW PRODUCTS DISPLAYED:



Baash-Ross "PB" Quick Change Production Blocks are an advancement in block design, providing greater speed and simplicity in meeting the varying requirements of modern production operations. The "PB" can be used as a two-sheave unit where extra lifting power is required or can be converted to a one-sheave unit where fast block travel is desired. Conversion is accomplished by disconnecting one section of the "PB" and anchoring it to a floor plate in a corner of the rig. The lines through this half of the block then become dead, and the other half to which the connector is attached becomes a single sheave unit.

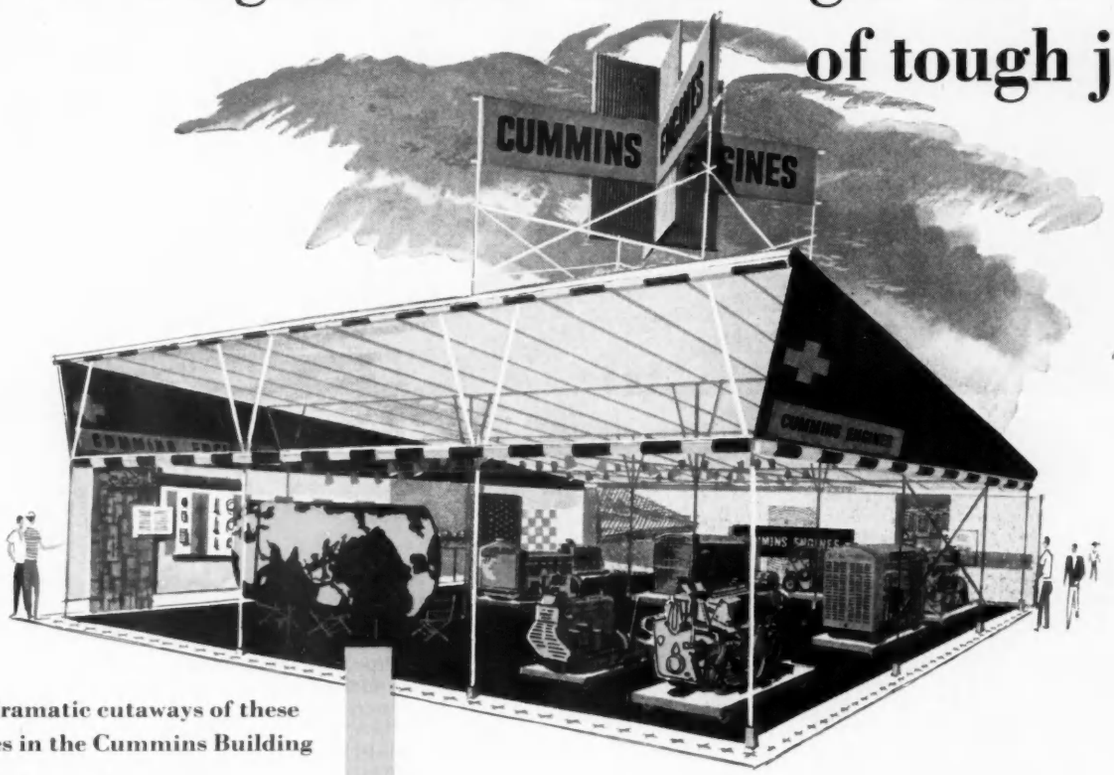
Circle No. 259 on Postcard, Page 315

Baash-Ross Type "UPS" Casing and Landing Heads feature a unitized packer and slip arrangement in which the packing unit which seals around the casing string and the slips that support the casing are all in one hinged unit that wraps around the casing and is locked in place by inserting a single bolt. The packing rubber is firmly supported between steel gland plates and can be packed off around the casing by tightening equally-spaced gland bolts. The slip segments are hinged together in order to be placed around the casing in one unit. They seat in a tapered bowl in the body of the head with ample area to support the longest strings of commonly-used casing. There is no need for internal threads, grooves or other easily-damaged packer-holding devices in the head.

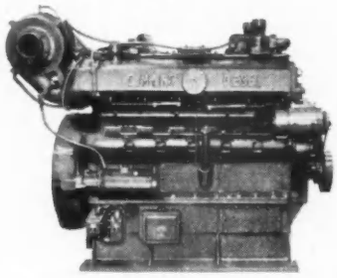


Circle No. 260 on Postcard, Page 315

See the engines that make light work of tough jobs

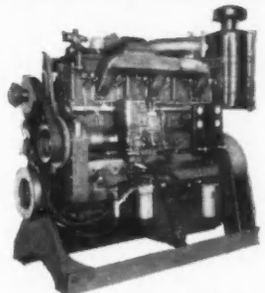


See dramatic cutaways of these engines in the Cummins Building



Model VT-12 Turbocharged 600 h.p.

Model JBS-600 150 h.p.



Model NHRS 300 h. p.

Visit the Cummins Engine Building International Petroleum Exposition

S. E. Corner Block 201, North Extension... Date: May 14-23

In Cummins Engine Company's new Oil Show building, you can examine at close range the rugged, portable engines that outperform all other engines in their power range (60-600 h.p.).

True: because of careful engineering and building . . . because of advanced research that gave birth to such advantages as Cummins' exclusive fuel system for dependable, economical fuel injection and metering. It's because of these good reasons—and because of the fast service offered by an exclusive parts and service organization—that Cummins Engines are oil field pace-setters *everywhere.*

But get all the facts at the show. Cummins factory and dealer representatives look forward to visiting with you in Tulsa!

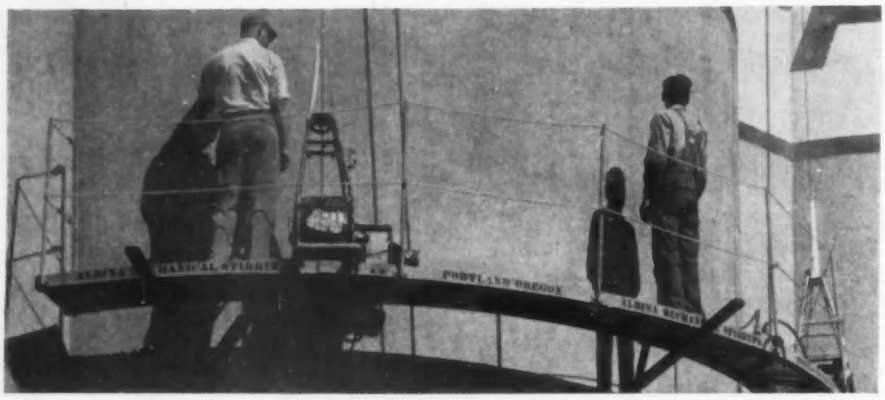
CUMMINS ENGINE COMPANY, INC.
Columbus, Indiana

Export: Cummins Diesel Export Corporation, Columbus, Indiana, U.S.A. • Cable: CUMDIEX

CUMMINS

Albina Engine and Machine Works Block 204

NEW PRODUCTS DISPLAYED:



Albina's Curved Fabricated Staging Planks fulfill all swing stage requirements. Single or bolted sectional planks are available in standard lengths to 28 feet and are made in two or three sections according with Curved Staging Plank at the Exposition.

Circle No. 262 on Postcard, Page 315

Airetool Mfg. Co.

Booths 151 and 152, Oklahoma Building

NEW PRODUCTS DISPLAYED:

New High Speed Joint Cleaner automatically cleans inside or outside pipe ends or threaded joints in six to eight seconds. The new joint cleaner, designed to speed reconditioning of old or reclaimed well pipe and pipe lines, requires no change-over of equipment to clean inside or outside and will clean two to five-inch pipe ends. A wire brush head revolves around the pipe ends removing all deposits. Also the cleaner has provision for shooting a solvent or cleaning fluid onto the pipe end to dissolve the caked material. The joint cleaner consists of an air-driven motor and a processing head containing a spring loaded brush guide and wire brush. The motor is a single stage, air driven type, slip-fit constructed.

Circle No. 261 on Postcard, Page 315

Armco International Corporation

E. of Block R

PRODUCTS DISPLAYED:

Special Nestable Culvert; and Pipe-Arch.

Armco Drainage & Metal Products, Inc.

East of Block R

PRODUCTS DISPLAYED:

A standard Steelox building houses the joint exhibits of Armco Steel Corporation, Armco International Corporation, Sheffield Steel Corporation, and Armco Drainage & Metal Products, Inc.

Armco Spiral Welded Pipe; Surface Casto needs. Albina will demonstrate its Electric and Air Powered Mechanical Stirrups

ing; other Line Pipe; Conduit for Road Crossings, and foundation piling; A Flow Model illustrating hydraulic advantages of pipe-arch versus pipe and Armco End Sections; Asbestos Bonded Pipe for Sewer and other Drainage lines; Multi-Plate Pipe; Arches; Pipe Arches for large culverts and underpasses; Hel-Cor pipe for drainage, subdrainage (perforated) and air lines; Tunnel Line Plate with high strength-to-weight ratio; Sheeting; Metal Bin-Wall; Flex-Beam Guardrail.

American Car and Foundry Company

Booth 54-N and Mid-Continent Supply Co. Booth

PRODUCTS DISPLAYED:

ACF lubricated plug valves with Limitorque operators; ACF lubricated plug valves with cylinder operators for use of air or hydraulic; diamond port valves; cutaway models of steel and aluminum, multiport and gear operated valves; 4" carbon steel full round port Cone-gear operated valve in the 400 class.

The Autocar Company

NEW PRODUCTS DISPLAYED:

A large six-wheeled tandem diesel unit completely equipped oil field rig will carry on the platform-oil-field-body, two winches, roller tail pipe, gin poles, headache rack, boomers and chains.

Circle No. 264 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Trucks designed for Oil Field Operations; Rigs; Tractors; Diesels; Gasoline-Powered Units.

Use Mailing Card for Additional Information

Note that each equipment item shown on these pages is identified by number. For additional information circle the corresponding numbers on the convenient mailing cards on pages 315-316. WORLD will do the rest. You'll find it helpful to tear out the card first and keep it in your hand as you go through the section and circle the desired numbers.

Alten Foundry and Machine Works, Inc.

Booths 74 and 75, Oklahoma Building

NEW PRODUCTS DISPLAYED:

The Model A-40-L Pumping Unit is designed for shallow wells, but it has an extra long stroke to provide maximum production. The full length of this stroke is 30 inches but it is adjustable to 26 or 22 inches. The samson post, frame and beam are of all-welded steel construction. Structural rating is 4000 pounds. Helical gears are made from forged steel super-flame hardened. Equipped throughout with high capacity tapered roller bearings, the A-40-L has a double reduction ratio of 33.2:1. Torque rating is 17,500 inch pounds.

Circle No. 263 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Two New Alten Multi-Purpose Tubing Heads; a heavy-duty, pull-through type Stuffing Box with built-in oil reservoir and patented handle that permits packing take-up from every position; two Wonbolt Polished Rod Clamps, and a New Casing Support.

Area Near Entrance

DOLOFRAC

FROM "TIGHT" CALCAREOUS AND SILICEOUS FORMATIONS

DOLOFRAC gives extra protection!

Western Dolofrac treatments HAVE NO harmful "side effects." This is because: (1) Dolofrac contains an INTERNAL BREAKER which assures breakout independent of other breaking actions such as acid reaction, etc. (2) Dolofrac WILL NOT form harmful emulsions with crude oil. It contains a DEMULSIFYING chemical to prevent formation of damaging emulsions which cause slow cleanup.

CONTACT YOUR NEAREST WESTERN REPRESENTATIVE — NOW — FOR FULL DETAILS ABOUT WESTERN DOLOFRAC OR WRITE DIRECTLY TO THE WESTERN COMPANY, BOX 310, MIDLAND, TEXAS.

LOOK AT THESE IMPORTANT DOLOFRAC ADVANTAGES . . .

1. Western Dolofrac treatments have never failed to bring IMPORTANT PRODUCTION GAINS where pay zones had additional productive capacity.
2. Western Dolofrac treatments have FASTER CLEANUP. Because of its chemical composition, Dolofrac forms no harmful emulsions with crude oil — SAVES expensive rig time. (In some areas, Dolofrac's cleanup time is several days less than required by other methods.)
3. Western Dolofrac has positive BREAKOUT. Because of its INTERNAL BREAKER, Dolofrac automatically returns to low viscosity (3 to 8 cps.) within a few hours, regardless of acid reaction or other outside breaking factors.
4. Western Dolofrac contains STRONGER ACID SOLUTION and has RETARDED ACID REACTION. Formation permeability is increased at greater distances from the bore hole, because acid does not react with formation rock until gel breaks. This means DEEPER PENETRATION with LIVE ACID ACTION.
5. Each Western Dolofrac treatment is DESIGNED INDIVIDUALLY to meet YOUR particular needs by experienced laboratory and field treatment engineers.

THE WESTERN COMPANY

General Offices, Box 310, Midland, Texas

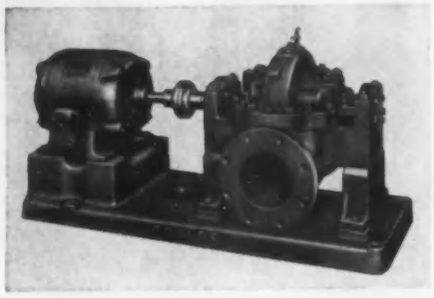
Odessa	Hobbs, N. M.	Borger
Midland	Levelland	Guymon, Okla.
Snyder	Seagraves	Ulysses, Kan.

WESTERN
Engineered
WELL SERVICES

Goulds Pumps, Inc.

Booth 90-N, North Area

NEW PRODUCTS DISPLAYED:



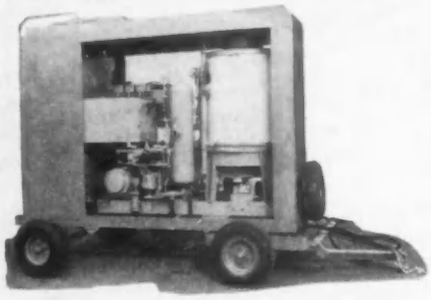
A New Line of Single Stage Double Suction Centrifugal Pumps comprises 19 sizes and provides capacities up to 6400 gallons per minute, heads up to 260 feet. An open rotating model of this new line has features which include wide interchangeability of parts—only three shafts and rotating parts used in full range of 19 sizes—short bearing spans cut over-all length as much as 50 percent, conventional stuffing boxes or mechanical seals can be used to best fit conditions of service, unique locking device on shaft sleeves permits change of rotation in field without construction changes.

Circle No. 265 on Postcard, Page 315

Clayton Manufacturing Company

Block 9, Texas Drive

NEW PRODUCTS DISPLAYED:



A 50 hp Forced Recirculation Steam Generator mounted on a rubber tired trailer provides a completely self contained boiler room on wheels. This generator can supply steam quickly, with full working pressure being attained within five minutes from a cold start. It is compact, has automatic operation and safety control, and has a dual purpose burner which allows optional use of either gas or oil for fuel.

Circle No. 266 on Postcard, Page 315

Gustin-Bacon Manufacturing Company

Booths 25 and 26, Silver Lane

NEW PRODUCTS DISPLAYED:

Ultrafine Glass Fiber Pipe Insulation is a one-piece molded fine glass fiber insulation with one seam. It is flexible, resilient, insoluble in water, exceptional in thermal efficiency, won't break or crumble, is easy to cut with a knife. It is available in six-foot lengths in a wide variety of sizes and thicknesses for use as pipe insulation where temperatures don't exceed 350° F. or as an outside layer of high temperature insulation. This new pipe covering resists the attack of most acids and alkalis and is not corrosive to metals.

Circle No. 267 on Postcard, Page 315

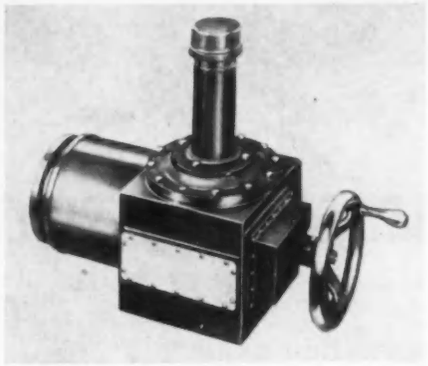
OTHER PRODUCTS DISPLAYED:

Gruvagrip Pipe Fittings, a complete line of malleable fittings for grooved pipe, including els, T's, crosses, laterals, nipples, caps, and reducers.

Janette Electrical Manufacturing Company

Booth 8N, North Area

NEW PRODUCTS DISPLAYED:



The Gate Valve Drive, fully automatic, has a Tork-Type clutch which allows the power drive to be completely disengaged without buildup excessive force in overrun; and the drive can be re-engaged when the motor speed and torque are most desirable. Other features: handwheel which can operate the valve in case of power failure; completely controlled backseating; availability in five models.

Circle No. 268 on Postcard, Page 315

The Linear Valve Drive is constructed to give the reciprocating linear motion used for operating applications. Linear motion is obtained with a threaded drive shaft, which is driven by internal threads in the worm gear of the gear motor.

Circle No. 269 on Postcard, Page 315

The Rotary Valve Drive is available in 29 different types. Limit switches, for limiting the shaft drive in either rotation, as well as handwheels and clutches which permit manual operation, are available with double reduction type motors.

Circle No. 270 on Postcard, Page 315

Aluminum Company of America

Booths 52-55, Scientific and Technical Building

PRODUCTS DISPLAYED:

Alcoa Utilitube and Fittings; Heat Exchanger Tubing; Pipe and Fittings; Architectural Products; Aluminum Electrical Products; Fasteners; Paint; Castings; Aluminas; Clourides; Alumina Fluid Catalysts; Aluminum Pipe Wrenches; Aluminum Hand Railings; Alumina Desiccants.

Allan Edwards, Inc.

Booths 3, 4, and 5, California Building

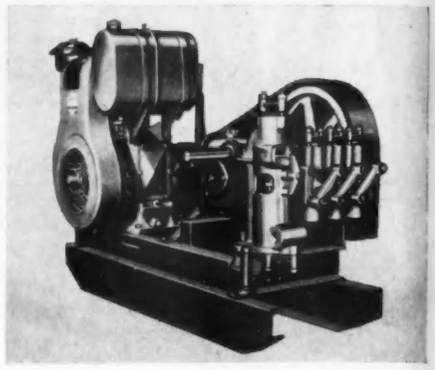
PRODUCTS DISPLAYED:

Edwards Concrete Pipe Line River Weights; Edwards Pipe Line Split Welding Sleeves; Edwards Concrete Pipe Line Market Post; Lightnin Mixers; Enniscope Electronic Meter and Cut; Recorder; Fire Fighting Equipment; Gas Detection Instruments; Gas Separation Equipment; Porcelain Products of the Lapp Insulator Company; High Pressure Equipment; Non-Sparking Safety Tools.

John Bean Division

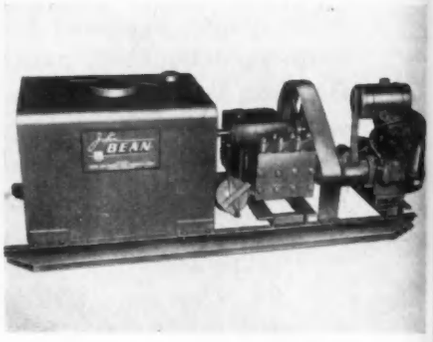
Booth 223, Oklahoma Building

NEW PRODUCTS DISPLAYED:



The John Bean Diamond Core Drill Pumping Unit facilitates diamond core drilling, seismograph, salt water disposal, repressuring, and other field processing operations. It is used primarily for pumping water down the drill holes for removal of cuttings. The skid-mounted unit consists of a John Bean Triplex inside-packed high pressure pump with an AGH Wisconsin gasoline engine, clutch take-off assembly, and drives. The pump has hard including abrasive materials. Pump capac- porcelain-lined or ceramic cylinders which enable it to handle many types of fluids, ity is 20 gpm at 600 psi.

Circle No. 271 on Postcard, Page 315



The John Bean Inhibitor Injection Pumping Unit injects an inhibitor under pressure into a gas pipe line to reduce corrosion by neutralizing hydrogen sulphide. Mounted on a steel skid, the unit consists of a Model 620-1 outside-packed Triplex pump, a 50-gallon all-steel tank, a strainer, a gasoline engine, and drives. Pump capacity is 1 gpm at 6000 pounds pressure. The pump has a compact design featuring an all enclosed drive end in which all working parts run in a constant bath of clean oil, rugged eccentric drive, hardened stainless steel outside-packed guided plungers, and poppet valves with tapered seats.

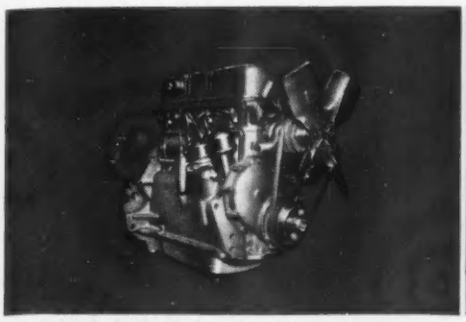
Circle No. 272 on Postcard, Page 315

Consolidated Western Steel Division – United States Steel Corporation

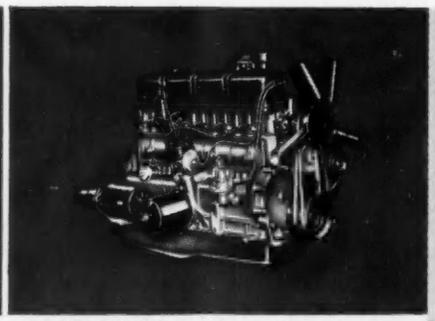
Block 2

PRODUCTS DISPLAYED:

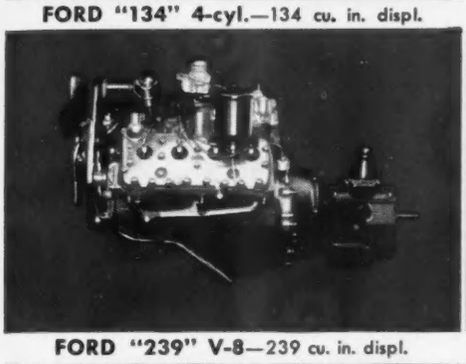
A Section of the Largest-Diameter Gas Line in the World, the 34-inch Pacific Gas and Electric Company Line; Photos of Storage Tanks, Refinery Vessels, and Pipe Line Bridges; Photos of New Type Steel Dock Barge; Use of High-Strength Pipe for Underground Storage of Gas.



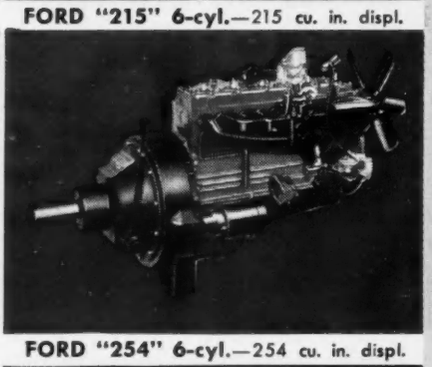
FORD "134" 4-cyl.—134 cu. in. displ.



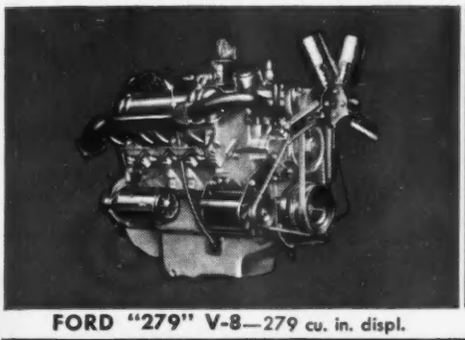
FORD "215" 6-cyl.—215 cu. in. displ.



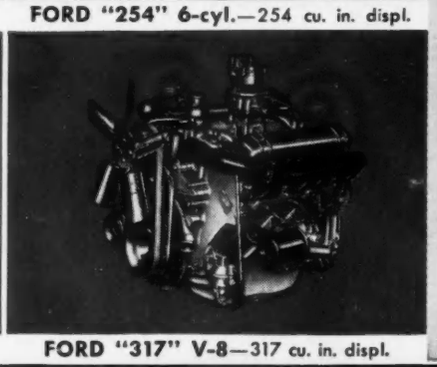
FORD "239" V-8—239 cu. in. displ.



FORD "254" 6-cyl.—254 cu. in. displ.



FORD "279" V-8—279 cu. in. displ.



FORD "317" V-8—317 cu. in. displ.

OIL FIELD Applications of FORD Industrial Power:

- EARTH BORERS
- CRANES
- CEMENT TRUCKS
- CLEAN OUT MACHINES
- HOISTS—WINCHES
- SPUDDERS—WELDERS
- CASING PULLERS
- DRILLERS
- DRILLING RIGS
- FORK LIFT TRUCKS
- PIPE LINE PUMPS
- PIPE LINE INSULATORS
- OIL WELL PUMPS
- MUD PUMPS
- PIPE PULLERS
- SERVICING UNITS
- SWABBING UNITS
- PORTABLE LIGHTING SETS
- STAND-BY POWER

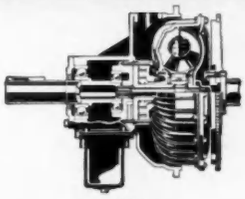
and many others

Specify FORD Power for PROFIT!

More and more oil field equipment manufacturers and operators are solving the problems of efficient, dependable, economical power by *specifying* Ford!

Six Great Series of Engine Assemblies or Complete Power Units are available in the present line of Ford Heavy Duty Industrial Engines. They range from 134 cu. in. to 317 cu. in. displacement . . . every one precision-built, thoroughly tested and ready-to-run.

Write for current literature and, when you've looked it over, our experienced Sales Engineers will be happy to develop recommendations to fit your application upon request. Do this today.



FORD MULTA TORQUE CONVERTER

On a drilling rig, for instance, the torque converter will maintain constant torque and protect expensive tools by its cushioning effect. This means fewer broken drill pipes, less time spent fishing for tools and more economical operation. The entire rig is protected against shock. Available with our "215," "239" and "254" Engines or Power Units at low additional cost.

INDUSTRIAL ENGINE DEPARTMENT
FORD MOTOR COMPANY
15050 Woodward Avenue, Highland Park 3, Michigan

FORD MOTOR COMPANY IS CELEBRATING ITS FIFTIETH ANNIVERSARY — 1903-1953

Ford
INDUSTRIAL ENGINES AND POWER UNITS

Pipe Line Development Company

Booth 72-N

NEW PRODUCTS DISPLAYED:

Smith-Clamp is a pipe line repair clamp with a unique pilot pin sighting device for locating the point of its leak repair cone exactly over the leak. It is recommended for rust hole leak repairs for pressures 2000 pounds per square inch or more and also for low pressures.

Circle No. 273 on Postcard, Page 315

Welding Plates, companion pieces to Smith-Clamps, are designed to be used with Smith Clamp when welding a steel patch over the leak is desirable. Designed to fit over the clamps, these plates can be welded to the pipe without disturbing the Smith Clamp.

Circle No. 274 on Postcard, Page 315

Silastic (Silicone compound) leak repair cones are used with Smith-Clamp. They are designed for higher temperature applications and will withstand about 200 degrees more temperature than ordinary pipe line packings of rubber or synthetic rubber composition.

Circle No. 275 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Weld-Ends.

Oakite Products, Inc.

Booths 22 and 23, Texas Building

NEW PRODUCTS DISPLAYED:

Oakite Interior Tank Cleaning Unit, Model 324, installed in the top of a tank car dome, discharges hot detergent solution through two rotating spray nozzles at approximately 100-175 pounds pressure against all interior car surfaces to remove oils and residues. This method eliminates hand brushing, scraping and steaming out procedures.

Circle No. 276 on Postcard, Page 315

Oakite Fogging Unit, Model 523, is designed for use where heavy duty cleaning is not required. Readily fastened within the dome or the tank of the car to be cleaned, this unit's nozzle assemblies deliver detergent solution in the form of a fine fog which penetrates and loosens oil deposits.

Circle No. 277 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

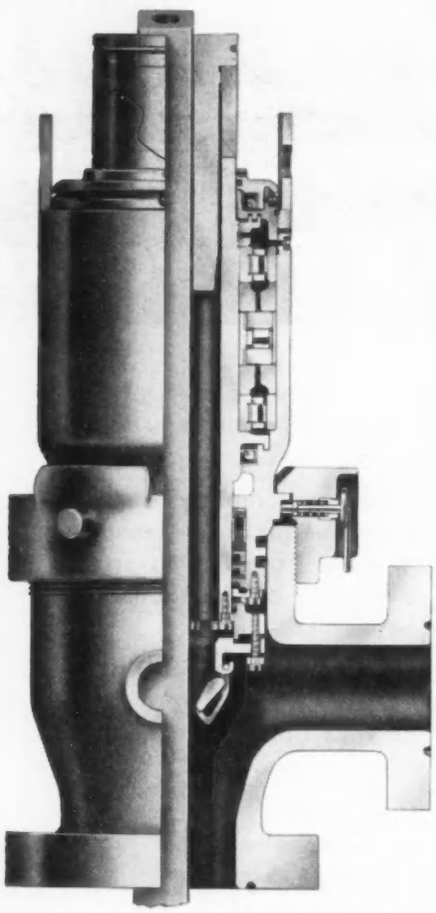
Steam-Detergent Guns for Heavy-Duty, All-Purpose Cleaning and Paint Stripping Operations; Chemical Compounds for Tank Car Cleaning, Storage Tank Cleaning, Tower Cleaning, Paint Stripping, Heat Exchanger Cleaning and Descaling.

Shaffer Tool Works

Booths 1 and 2, Oklahoma Building

NEW PRODUCTS DISPLAYED:

Shaffer Type 51 Combination Rotating Blowout Preventer and Stripper is a new addition to the Shaffer line of pressure control equipment. It incorporates many of the features of the Type 50 Combination Rotating Blowout Preventer and Stripper into a smaller sized unit particularly recommended for pressure protection during slim hole drilling, workover, drilling out and production operations. This tool maintains a continuous seal around all elements in the drill string and automatically adjusts itself to maintain this seal as varying diameters are passed through the unit. A quick releasing bonnet permits the entire internal mechanism to be removed for passing such large diameter tools as bits and reamers and the entire design of the unit is carefully engineered to assure maximum ease and convenience in carrying out standard drilling procedures.

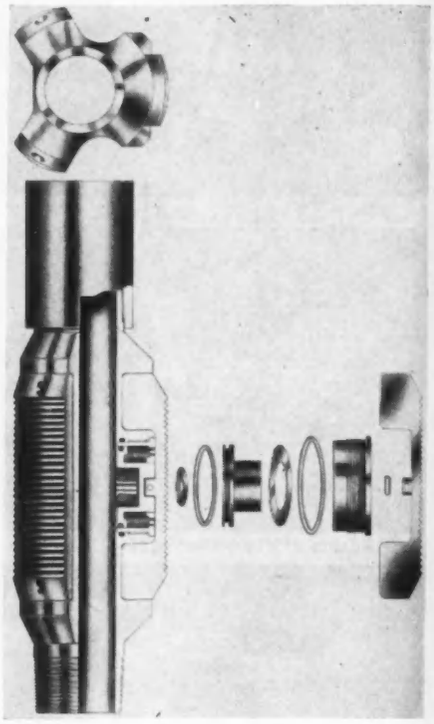


Circle No. 278 on Postcard, Page 315

Page Oil Tools, Inc.

Booth 13, Silver Lane

NEW PRODUCTS DISPLAYED:



Type "R" Tubing Anchor has a single piston which is removable in a matter of minutes and is used to power the live slip. This large pressured piston and slip working opposite two unpressured slips at 120-degree angles utilize a simple leverage law, producing a maximum amount of pressure in the correct locations. The piston chamber is designed to retain special grease to protect sealing element against undesirable well effluents such as hydrogen sulfide and gypsum. The piston assembly, made of stainless steel, is easily replaceable in the field.

Circle No. 279 on Postcard, Page 315

Harrisburg Sales and Service, Inc.

Booth 96, Texas Building

NEW PRODUCTS DISPLAYED:

A New Hydraulic Piston Puller provides a safe, certain, and efficient method of removing the piston from the piston rod. Because of its design and hydraulic principle, there are no chains, blocks, stands, nor adjustments needed. Heat treated to withstand the roughest treatment, the piston puller is compact, strong, and easily handled. It will safely and quickly remove the piston without damage to either the piston or piston rod.

Circle No. 280 on Postcard, Page 315

The New Diamond Hard Pump Rod gives a very high hardness on the wearing surface and has a high tensile strength in the core. Longer rod wear is assured by heat treating the alloy steel used to combine maximum hardness, strength, and durability. Each rod is ground to a perfect finish to assure precision tolerances and to eliminate packing replacements.

Circle No. 281 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Mud Pump Pistons; Low Pressure Alarm; Harrisburg Muderator; and Harrisburg Super Diamond Hard Pump Liners.

The Continental Supply Company

Broderick & Bascom Rope Company

D & B Division (Emsco Manufacturing Company)

Emsco Manufacturing Company

Clayton Mark & Company

New Bedford Cordage Company

New York Belting & Packing Company

The Youngstown Sheet & Tube Company

Blocks 6, 7 and 8

The Lunkenheimer Company

Blocks 6, 7, 8, and Booths 67, 68, Oklahoma Building

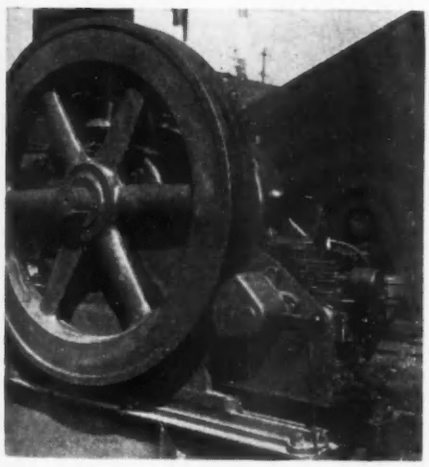
Ladish Company

Blocks 6, 7, 8 and Booths 7-9, Kansas Building

Gardner-Denver Company

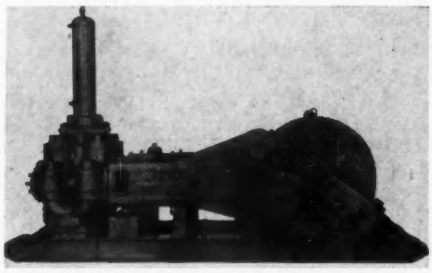
Blocks 6, 7, 8 and Block 122

NEW PRODUCTS DISPLAYED:



The CSCO Engine Starter can be furnished with air-cooled engine or battery motor. It has a positive friction drive with no slippage. Two pliable rubber friction wheels astride a central gear are forced against the flywheel rim by passing slightly beyond center when engaged by the hand lever. The slotted holes in the housing make it possible to adjust compression of the rubber friction wheels to a value which absorbs the full torque of the starting motor without slippage. So long as the starting motor exerts a driving effort, the reaction of the flywheel resistance and the gear train hold the friction wheels to the engaged position. At the first firing of the engine, the friction wheels are disengaged.

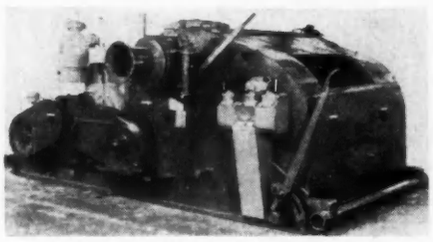
Circle No. 282 on Postcard, Page 315



NEW PRODUCTS DISPLAYED:

Gardner-Denver Type "GX" Power Pumps retain such features of all Gardner-Denver mud pumps as the use of heavy-duty bronze sleeve type main and eccentric rod bearings, large eccentrics instead of small crankpins, positive exclusion of mud from the power end, and divided fluid cylinders. Important new features have been added which include double helical gears, one-piece connecting or eccentric rods, positive pressure lubrication, interchangeable right or left fluid cylinders, screwed valve covers, and screwed type stuffing box glands.

Circle No. 283 on Postcard, Page 315



The GB-160-T (single drum) Torque Converter Rig, smallest of Emsco power rigs and a companion to the GB-160-TS (double drum) rig, has an over-all length of 14 feet, 4½ inches. The rig has a two-speed, heavy-duty herringbone gear transmission; a built-in hydraulic torque converter for a wide range of speeds; a chain drive between the torque converter and engine for freedom in selection of power; a neutral brake of greater safety and operating ease; a water spray system for efficient cooling of the main drum brake rims.

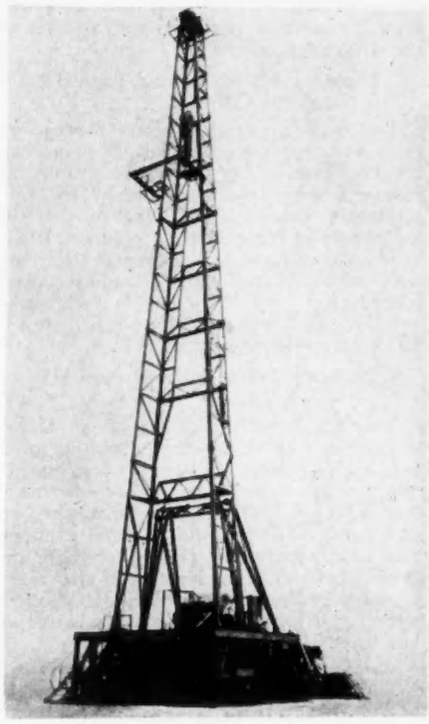
Circle No. 284 on Postcard, Page 315

Emsco L-Series Swivels feature a platform-mounted gooseneck, one-piece cartridge washpipe packing, true-cone roller bearing as the main bearing, replaceable bail pins, and replaceable sub and low center of gravity. Weight and height have been reduced and hook clearance increased.

Circle No. 285 on Postcard, Page 315

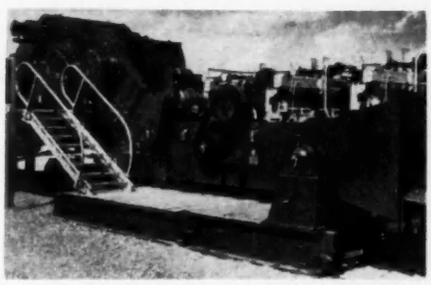
Emsco Pumping Units have been redesigned for new structurals, new equalizer, suspension, and new gear box. The gear reducer is completely roller bearing equipped. A new arrangement of the gear train, which provides separable gear and pinion, makes possible the mounting of the bearings in line with the wall of the case, assuring maximum bearing support. The gear box is a one-piece, rigid unit, heavily ribbed for added strength.

Circle No. 286 on Postcard, Page 315



Emsco's A-Series Open-Face Mast is a four-legged portable unit that can be assembled at ground level and raised in a smooth, uninterrupted operation, using only the power of the drawworks. Other features include larger floor area, speed pin connections, positive line control during raising and lowering operations, and seamless forged steel rims in the crown blocks. The mast and substructure are designed as a unit to be moved in one piece on auxiliary wheels or tracks. For longer moves, the mast is rigid enough to be transported as a unit, or it can be nested in sections.

Circle No. 287 on Postcard, Page 315



The Emsco GB-800, largest of the G-Series rigs and one of the most versatile in its power class, can be flat set or single-stepped. In the flat-set, one-package rig—with drawworks, built-in selective speed transmission and compounding transmission mounted on a common skid—it is not necessary, in moving, to break chains, oil lines or air lines. In the single-step, two-package rig, only the drawworks has to be removed from its pedestal. Pump drives are positioned at the back of the compounding transmission and in line, making it unnecessary to notch the substructure

or use V-belt idlers. Other features: location of all drawworks friction clutches on the outboard ends of shafts; two or three-engine compounding transmission; mechanical or fluid drives; enclosed, positive pressure lubrication; six forward and two reverse speeds through friction clutches at the drum shaft; three forward and one reverse friction clutch drives to rotary table; all valve controls mounted in a console at the driller's position.

Circle No. 288 on Postcard, Page 315

Emsco R-Series Traveling Blocks are even narrower than the former slim-lined models, have a low center of gravity to assure a smooth operating, fast-fall, straight-traveling block. Sheaves of the smaller blocks are one-piece forged steel. Sheaves of the other blocks in the line are made of alloy steel with one-piece, rolled forged steel rims. A reversible lubrication cartridge makes it possible to lubricate the block from either side.

Circle No. 289 on Postcard, Page 315

The Lunkenheimer "Non-Slip" Handwheel has a greatly increased closing pressure which eliminates seepage and unnecessary wear on valve parts, because valves can be closed tight. The Handwheel is octagonal in design which enables operators to exert greater closing pressure despite wet or greasy hands. It also minimizes the discomfort and danger to the operator in opening and closing valves on hot lines.

Circle No. 290 on Postcard, Page 315

Brodril Cable Tool Drilling Lines, by newly designed lay of strands and rope are specifically engineered to retain their elasticity over a longer period of time. Greater wearing qualities have been achieved in these lines by design of wire sizes to increase resistance to abrasion in the hole, at the clamp, over spudder sheaves and on the drum. The fiber core which serves as a foundation for the wire strands has been fortified with a preservative that prolongs its usefulness as a support, and an internal lubricant that prevents rusting and minimizes external friction.

Circle No. 291 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Rotary Table; Engines; Mud Pump; Petro Unions and Handle-Bar Unions; Cordage Products; Hose and Packing; V-Belt Drives; Preformed Yellow Strand Casing Lines; B & B Sand or Bailing Lines; Preformed Yellow Strand Winch Lines; Preformed Yellow Strand Rotary Drilling and Casing Lines; Core Barrel, Rod and Tubing, Torpedo, Tong, Jerk, Wrench, and Guy Lines; Steel, Iron and Bronze Valves; Lubricating Devices; Boiler Mountings; Cocks.

Nelson Electric Mfg. Company

Booth 168, Oklahoma Building

PRODUCTS DISPLAYED:

Explosion-Proof Motor Starters; Air Circuit Breakers; Junction Boxes and Control Stations; Pipe Line Sampler; Oil Field Motor Starters; Pipe Line Flange Insulation; Switchgear; Unit Substations; Instrument Panels and Cubicles; Special Control Boars; Graphic Panels; and Steel Switchracks.

Ross-Martin Company

Booth 13, Scientific and Technical Building

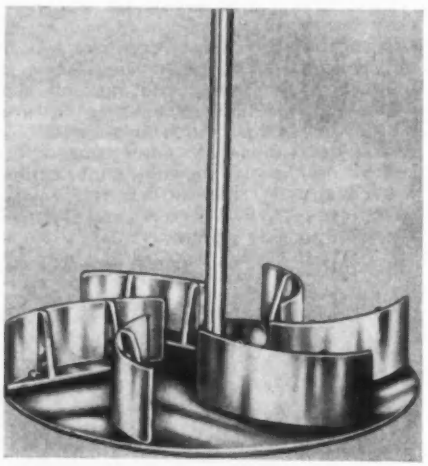
PRODUCTS DISPLAYED:

De Luxe V-96 Kraftbilt Vertical Rollfile, for filing rolled maps, tracings; H-342, H-354 Horizontal Rollfiles, for filing 42 and 54-inch maps from floor to ceiling in sectional units; G-34, G-36 Kraftbilt Strip Log Cabinets; E-24, E-28 Kraftbilt Electric Log Cabinets.

Mixing Equipment Co., Inc.

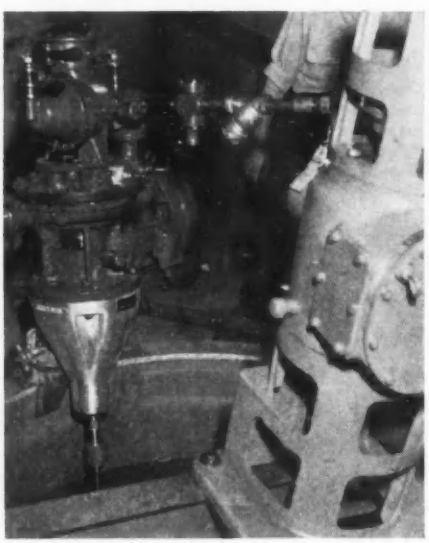
Block 11

NEW PRODUCTS:



"Lightnin" Turbine-Type Mixers have important uses in suspending weight material. Turbine impellers used on these mixers provide circulation throughout the entire tank and provide uniformity of content. The horsepower input to the mixer varies between 5 and 25, depending upon the tank size and mud weight. A 25 horsepower "Lightnin" mixer has a pumping capacity in excess of 10,000 gallons per minute at the impeller. Electric, steam, hydraulic, and gasoline drives can be used. The impeller rotates at speeds of 68 revolutions per minute or lower and is made with cast, curved blades to resist abrasion.

Circle No. 292 on Postcard, Page 315



"Lightnin" Flash Mixer has a high speed cutout propeller operating at 1150 revolutions per minute with a 3 to 5 horsepower drive. Mud from the well is circulated continuously through a 200 to 300 gallon flash mixer tank. Ingredients may be dumped in the tank from the sack with no necessity for slow feeding and are dispersed instantly. Electric, hydraulic and steam drives are available for the Flash Mixer.

Circle No. 293 on Postcard, Page 315

Owens-Corning Fiberglas Corporation

Booths 97, 98 and 119-122, Kansas Building

PRODUCTS DISPLAYED:

Coromat anti-corrosion material; outer wrap and hand-wrapped fabrics for covering underground pipes; high and low temperature insulation; roof insulation and sound control products for industrial plants; and Fiberglas reinforced plastic pipe and tanks.

Reda Pump Company

Booths 50, 51, 54, 55, Kansas Building

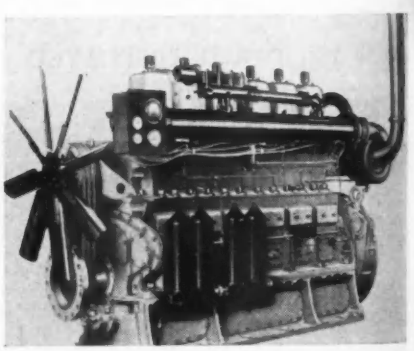
PRODUCTS DISPLAYED:

Reda Submergible Centrifugal Pumps; Complete Line of Pumping Equipment from 300 to 15,000 bpd; Lifts from 1500 to below 10,000 feet; Fluid Volumes to 2500 bpd from 5½ inches OD 24-pound casing to 3000 bpd in 6⅝-inch OD 26-pound casing; to 7000 bpd in 6⅝-inch OD 24-pound casing; and to 18,000 bpd in 8⅝-inch OD 43-pound casing.

Waukesha Motor Company

Block J

NEW PRODUCTS DISPLAYED:



Two New Turbo-Supercharged Diesels equipped with torque converters are the 2894 cubic inch displacement, Model 6-LRDSU (cut) which develops a maximum of 475 hp, and the Model WAKDSU, 1197 cubic inch displacement which develops a maximum of 327 hp. The Model 6-LRDSU engine develops 570 horsepower at 1200 rpm, but with all oil field accessories, including radiator, top rated horsepower is 475.

Circle No. 294 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

Model NKRU, 1905 cubic inch displacement with 294 maximum hp; the WAKBU, 1197 cubic inch displacement with 270 maximum hp; the 145-GKBU, 779 cubic inch displacement with 184 maximum hp; the 135-GZU, 451 cubic inch displacement with 118 maximum hp; and the 180-GLU, 144 cubic inch displacement with 30 maximum hp; the NEW Waukesha 135-Series of Diesel units represented by the Model 135 DKU, 426 cubic inch displacement with 116 maximum hp.

Stoppers

for the Oil Fields from Preparation to Pipelining

SEE THEM AT THE IH EXHIBITS IN TULSA

A new 1953 International-Superior pipeboom crawler and two improved International pumping engines will be featured show-stoppers at the International Petroleum Exposition in Tulsa, Oklahoma, May 14-23.

Two exhibits, one at the IH Building at the exposition grounds and the other opposite the IH District Office in the 500 block on East Second Street, will include tractors equipped with pipebooms, bulldozers, bucket-loaders and mowers, as well as diesel and gas engines—pay-off power for every oil field requirement from preparation to pipelining.

On display will be the recently announced Superior PBI-14A pipeboom, designed for the International TD-14A tractor, also shown will be the big PBI-24C pipeboom for the TD-24 tractor.

These booms feature greater lifting capacities, improved visibility, better boom and line speeds, new safety features and an improved load brake that gives operators a better "feel" when handling heavy pipe loads.

Two new pumping engines, the U-164 and U-264, will be shown along with other carbureted and diesel engines in the International line.

See us at the Show! And see your International Industrial Distributor for full details on how IH can pay off for you.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL HARVESTER

INTERNATIONAL

POWER THAT PAYS

★ **SNEAK PREVIEW** ★

When you visit the IH exhibit, be sure to see the sneak preview of the new International U-450 carbureted engine, one of the six six-cylinder models ranging in size up to 103 horsepower which will soon be on the market.

Above: Universal Friction Breakout Cathead.

Left: Slush Pump Valve.

We're Specialists

We build just one thing . . .

A BETTER BLOCK

McKissick advanced design blocks carry rated loads from 5 to 300 tons

Canny Scotty McBlock says:
"Get the most for your money"

In DEPENDABILITY
In QUALITY
In DESIGN

We have specialized in meeting the changing needs of the oil industry for over 30 years.

Catalog of McKissick products on request

McKISSICK

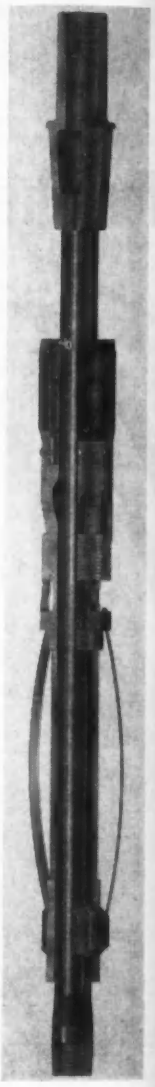
McKISSICK PRODUCTS CORPORATION
Box 2496 Tulsa, Oklahoma

American Iron and Machine Works Company

Booths 159-161, Oklahoma Building

NEW PRODUCTS DISPLAYED:

Type S and SLS packers include the following outstanding features: Positive Releasing Slips expand on a flat tapered surface which increases the area of contact, preventing the collapse of the slip mandrel or breakage in the slips; Positive lateral packer cup expansion makes a perfect seal with no sticking of cup; full opening maintained through the entire body of the packer; controlled packer cup expansion; easy setting; and a large bypass area which assures fast running and pulling through the heaviest mud.



Circle No. 295 on Postcard, Page 315

The Hydra-Cushion Slush Pump Valve and Seat provides a unique cushioning effect to help absorb the terrific impact resulting from high pressures.

The center of the seat and the lower part is so designed as to create a hydraulic cushion that absorbs the initial impact as a result of the mud trapped in the inside cylindrical section of the valve body by the center cushion of the seat.

Circle No. 296 on Postcard, Page 315

Universal Friction Makeup and Breakout Catheads are equipped with a safety rope divider designed to eliminate fouling of the catline and protects the driller at all times. Each part of these catheads is precision machined and inspected, using the finest methods and machines available. Both manual and air controls are available for the makeup and breakout models.

Circle No. 297 on Postcard, Page 315

OTHER PRODUCTS DISPLAYED:

American Iron "Flashwelded" Tool Joints; Straight Grip Tool Joints; Slush Pump Valves; Seats; Releasing and Circulating Overshots; "Amweld" Tool Joints.

Midwestern Geophysical Laboratory

Block 5

PRODUCTS DISPLAYED:

Instrument Truck; Shooting Truck; Dynamite Magazine; Portable Reflection Seismograph Equipment; Oscillographs; Galvanometers; Geophones; Geophysical Cables; Magnetic Assemblies; Hydraulic Servo-Mechanism Components.

at the Oil Show!

THE NEW

Ajax

SERIES TP-4000

Pump

for Fluid Injection

AJAX ENGINES

FEATURING HIGH EFFICIENCY

WITH MAXIMUM SIMPLICITY and ACCESSIBILITY!

Integrated to work in harness with the famous Ajax DP-70 11 x 14 Gas Engine, the rugged new AJAX PUMP is the result of years of work to produce a simpler, better oilfield pump for fluid injection service. • No gears. Minimum number of operating parts. It's a great pump! Get the facts in Bulletin 531.

See the new Ajax Pump at the Bethlehem Supply Company Exhibit, International Petroleum Exposition, Tulsa, May 14-23.

AJAX IRON WORKS

Builders of Gas Engines • Steam Drilling Engines • Industrial Steam Engines

CORRY, PENNSYLVANIA

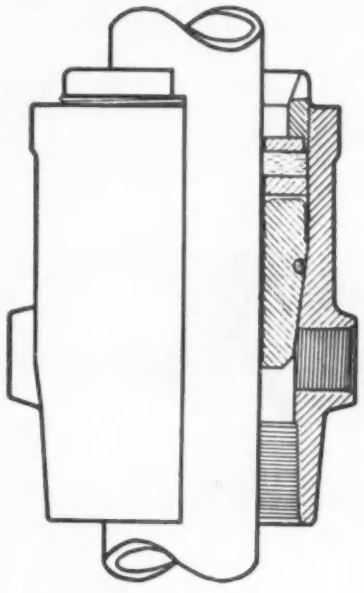
Oil Field Distributors: THE NATIONAL SUPPLY CO., PITTSBURGH, PA.

R. B. MOORE SUPPLY CO., BOLIVAR, N.Y. • BETHLEHEM SUPPLY CO., TULSA, OKLA.

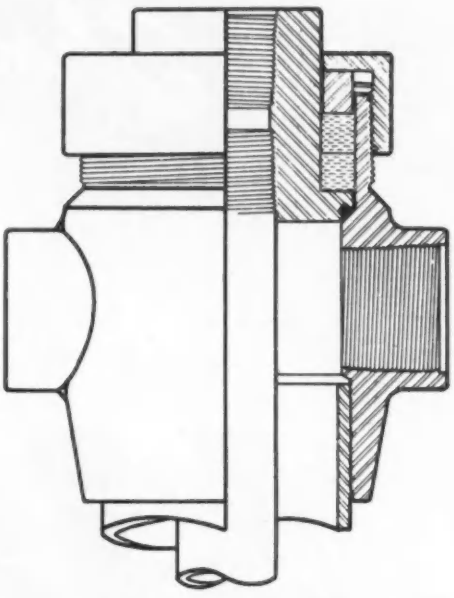
Hinderliter Tool Company Division, H. K. Porter Company, Inc.

H. K. Porter Company, Inc., Building, Drake Drive

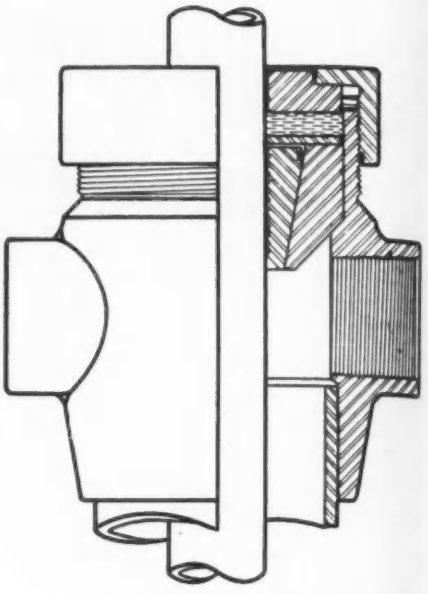
NEW PRODUCTS DISPLAYED:



Above: YLS Casinghead.
Below: YLS Casinghead with Siamese Adapter.



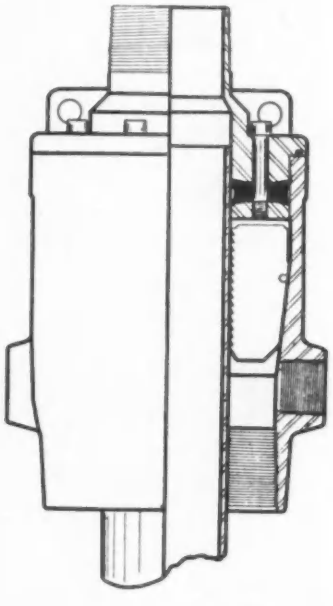
Type HW Two-in-One Tubing Head with tubing hanger, to which is connected tubing and landing nipple.



Type HW Two-in-One Tubing Head with slips and packing mechanism for slip suspension.

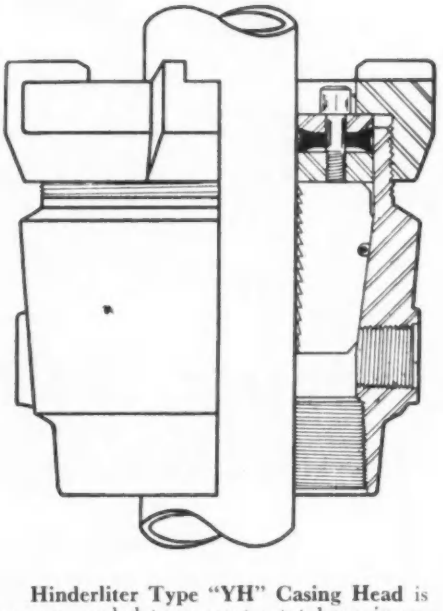
The Hinderliter Type HW Two-in-One Tubing Head has a full opening body of forged steel construction designed to withstand 4000 pounds test pressure or 2000 pounds cold working pressure. The design and construction of this head permits sufficient diversification to justify its use for pumping production, for flowing wells, for acidizing and repressuring projects. Hinged Type Drill Pipe Seal Units and many types of adapters obtainable for use in connection with the Two-in-One and Four-in-One heads make it possible to perform almost any production or work-over operation without removing the head from the casing.

Circle No. 299 on Postcard, Page 315



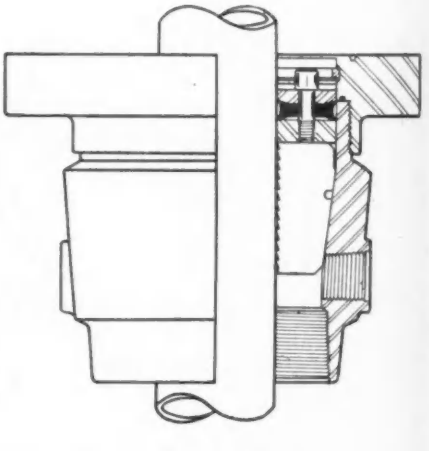
The Hinderliter Type "YLS" Casing Head provides an economical means of safely supporting and packing off casing strings on wells of medium depths and pressures with a minimum number of parts. The type "YLS" Casing Head is of slip suspension type full opening construction recommended to support a total maximum weight of 150,000 pounds of casing. Removable drilling flanges are available for attachment of standard blowout preventers to Type "YLS" Casing Heads. Siamese adapters allow connection to tubing head eliminating costly "nippling up" time and saving valuable rig time.

Circle No. 298 on Postcard, Page 315



Hinderliter Type "YH" Casing Head is recommended to support a total maximum weight of 240,000 pounds of casing. This casing is available for use with threaded tubing heads with removable top flange (for either blowout preventer attachment or permanent Christmas Tree installation) or with integral top flange. Several types of unitized packing are available and the slips are superior.

Circle No. 300 on Postcard, Page 315



Above: Type YH Casinghead.
Left: Type YH Casinghead with Cap.

Hinderliter Four-in-One Tubing Head is designed to permit lowering or removing well tubing under pressure without loss of well pressure or fluid, using a stripper rubber which automatically maintains a constant well pressure seal during the passage of upset tubing and couplings. This tubing head is an assembly obtained by installation of a stripper rubber unit in the body of the HW head and the addition of a bowl of forged steel construction attached to the top of the body to receive regular HW parts, when replaced by the stripper rubber in the body.

Circle No. 301 on Postcard, Page 316

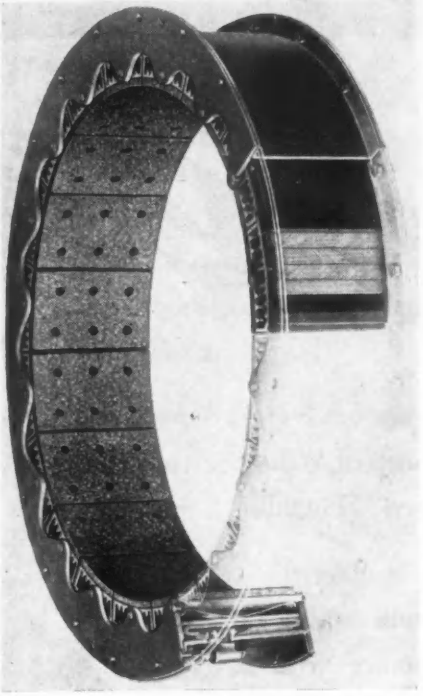
OTHER PRODUCTS DISPLAYED:

Tubing Heads; Tubing Hangers; Blowout Preventers; Christmas Trees; Cone Catcher; Slush Pump Operated Junk Basket; Circulating and Releasing Overshot; Safety Bull Plug; Wedge-type Wrist Pin.

Federal Fawick Corporation

Booths 53 and 54, Texas Building

NEW PRODUCTS DISPLAYED:



The New Fawick Type VC Air-Ring Clutch, a completely ventilated clutch of the rigid-type provides for transmission of power from the friction shoes through the torque bars to the metal side plates of the assembly. Manufactured in sizes ranging from 12-inch through 42-inch drum diameters with torque capacities ranging from 27,000 inch pounds to 380,000 inch pounds, unique design features found in this new air-operated clutch include: cooler operation inherent in drum clutch design plus isolation of the operating tube from the heat-generating friction surface; riveted, replaceable friction lining; and loose, expanding operating tube which can be replaced without removing clutch from shaft.

Circle No. 302 on Postcard, Page 316

The New Fawick Hydro-air Dual System Vehicle Brake for air equipped vehicles features air operation for service applications with an auxiliary or emergency hydraulic system for use in case of failure of the air system. The air and hydraulic systems are separate and may be applied either independently or simultaneously. Installation of these brakes can be made on most standard vehicles without modification or change in existing axles or drums.

Circle No. 303 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Industrial Clutches; Special Seal Assemblies; Three Brake Shoe Construction using a nine inch drum, for hydraulic over hydraulic; A Six Brake Shoe Construction using a 35-inch drum for a combination air and hydraulic system.

Aeroquip Corporation

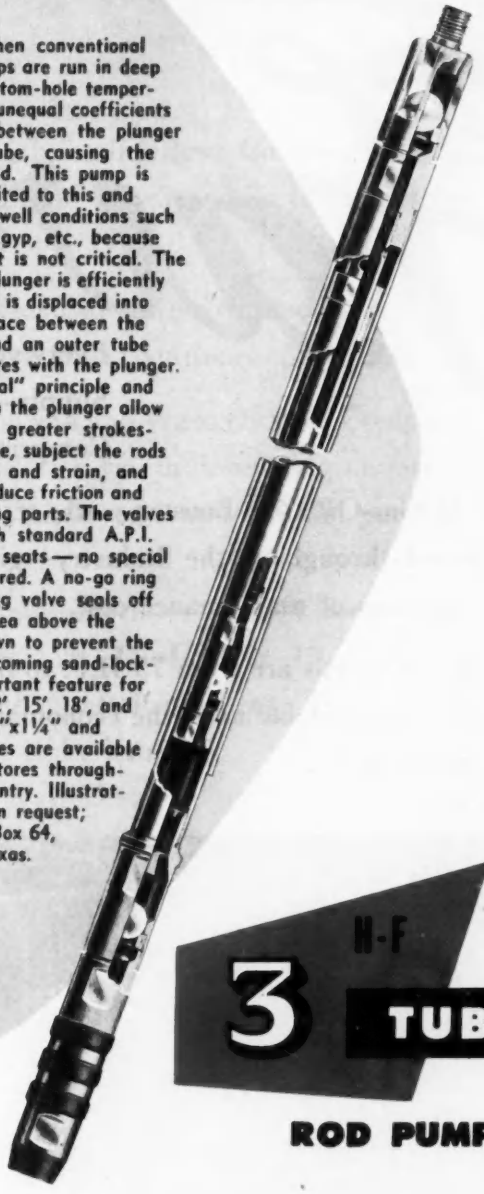
Booth 138, Oklahoma Building

PRODUCTS DISPLAYED:

Complete Line of Flexible Hose Lines; Detachable Fittings; and Self-Sealing Couplings.

best pump for high bottom-hole temperatures

Very often when conventional all-metal pumps are run in deep wells, high bottom-hole temperatures create unequal coefficients of expansion between the plunger and barrel tube, causing the plunger to bind. This pump is particularly suited to this and other unusual well conditions such as float sand, gyp, etc., because the plunger fit is not critical. The loose-fitting plunger is efficiently sealed as fluid is displaced into an annular space between the barrel tube and an outer tube that reciprocates with the plunger. This "fluid seal" principle and a small bore in the plunger allow pumping at a greater strokes-per-minute rate, subject the rods to less stretch and strain, and appreciably reduce friction and wear of working parts. The valves are fitted with standard A.P.I. size balls and seats — no special sizes are required. A no-go ring on the standing valve seals off the seating area above the pump hold-down to prevent the pump from becoming sand-locked . . . an important feature for sandy wells. 12', 15', 18', and 25' pumps in 2"x1¼" and 2½"x1¾" sizes are available from leading stores throughout the oil country. Illustrated literature on request; write to P. O. Box 64, Fort Worth, Texas.



H-F 3 TUBE ROD PUMP

HARBISON • FISCHER MFG. CO.

General offices and plant: FT. WORTH, TEX.

"Best Pumps in the Oil Patch"

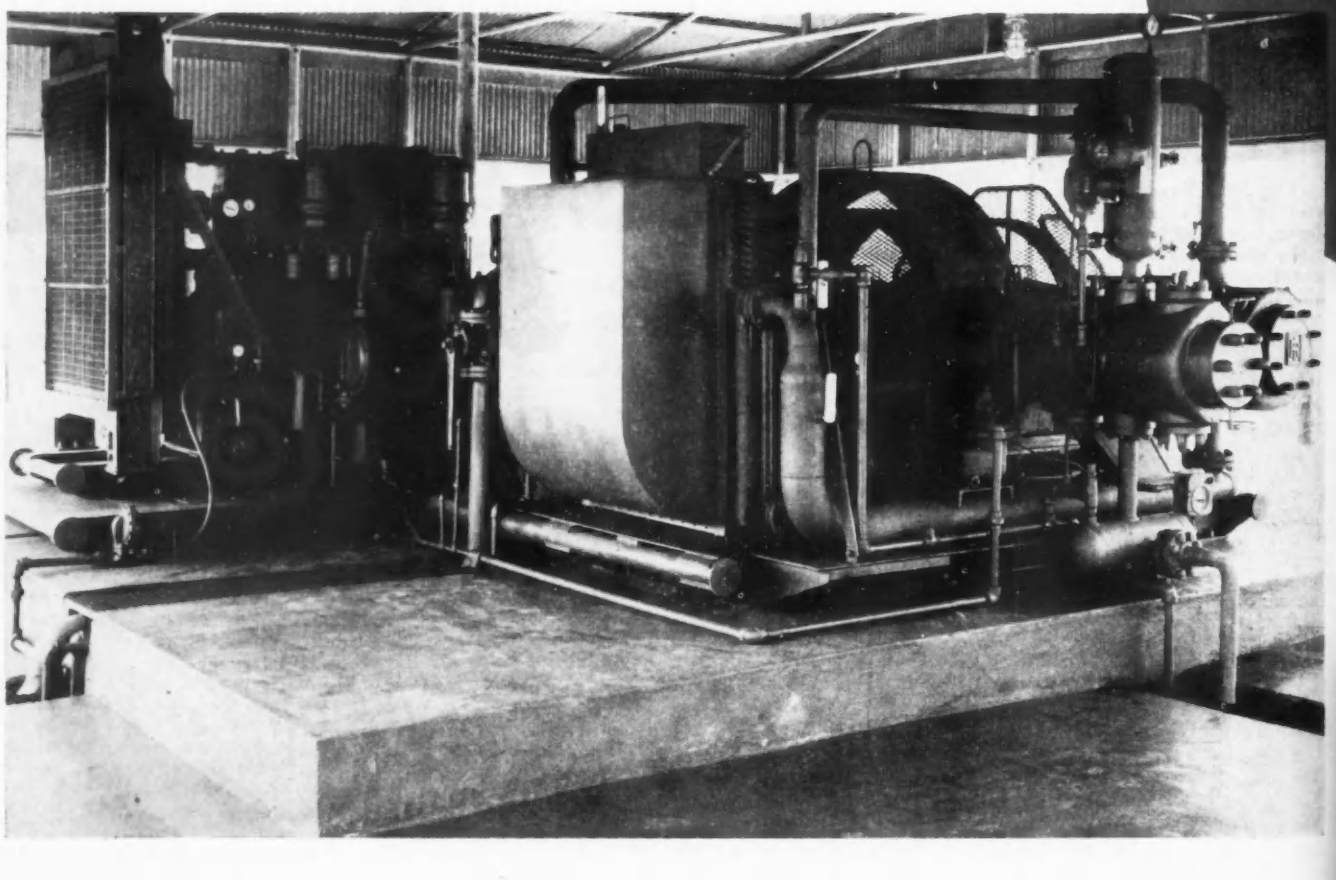
WILSON SUPPLY--INGERSOLL-RAND
Packaged Portable COMPRESSORS

Favorites

Every year emphasizes the leadership of Wilson Supply—Ingersol-Rand "Packaged" Portable Compressors "in the field."

For Gas-Oil Lift, Booster work, repressuring these compressors are to be found throughout the Industry—giving continuous performance with a minimum of maintenance cost.

If your needs are from 75 H.P. to 800 H.P. you will find an installation of these dependable units the economical answer to getting the job done most satisfactorily.



in the Field

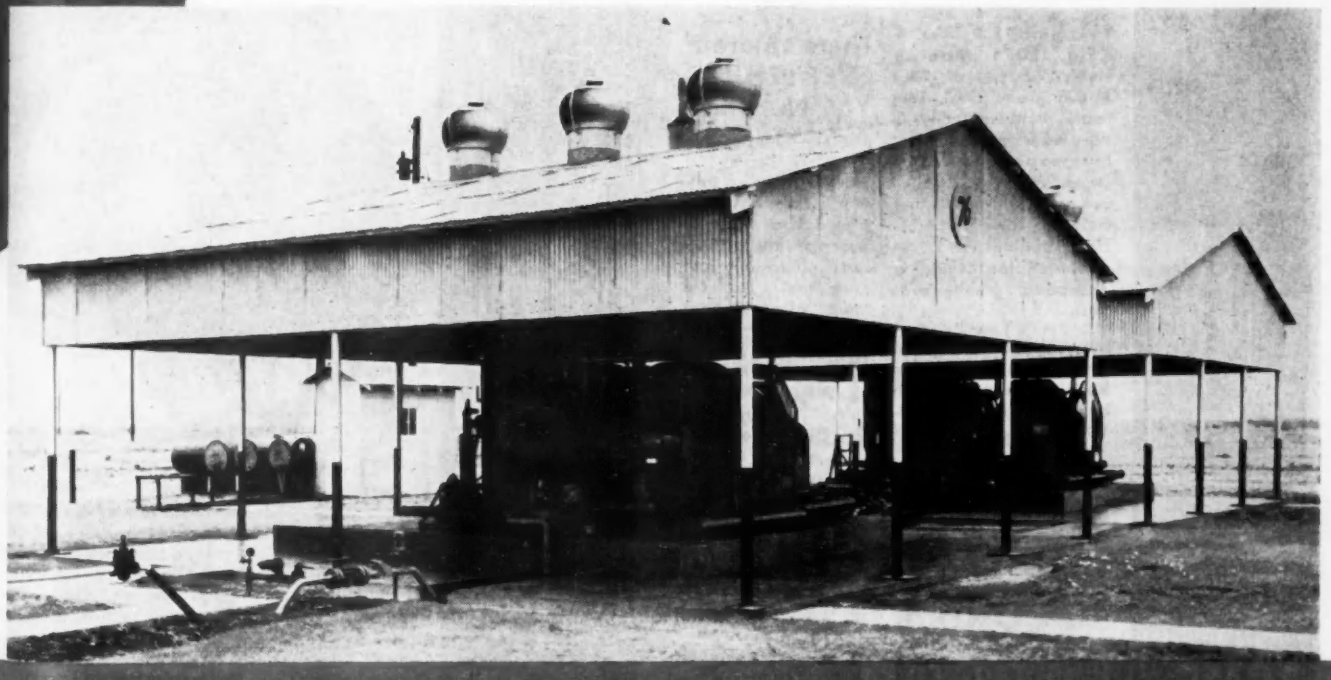
The "know how" of Wilson Supply Company in fabricating these Compressor units has been gained by years of experience and results in a worthwhile saving to the producer.

Wilson Supply Company pioneered the "closed" Gas Lift system of producing wells. This method is especially favored today as the value of gas continues to increase.

Whatever your compressor needs, you will find Wilson Supply Company personnel more than willing to work with you in developing an installation of these "Package" Portable Units to best serve the purpose.

•

Contact your nearest Wilson Supply Store or write "Compressor Division," Wilson Supply Company, P. O. Drawer 19, Houston, Texas, for detailed information and quotations. Please give suction and discharge pressure and volume to be handled.



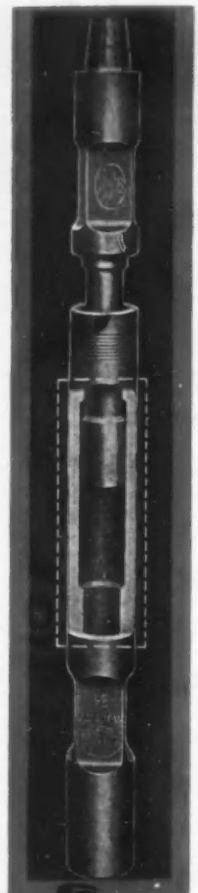
BRANCH STORES

TEXAS—Alice, Corpus Christi, Victoria, Bay City, Columbus, Barbers Hill, Liberty, Beaumont, Kilgore, Monahans. LOUISIANA —Lake Charles, New Iberia, Houma, Harvey, Shreveport.

WILSON SUPPLY COMPANY

1301 Conti St. (Corner of Walnut) . . . Houston, Texas

Sales Offices: Tulsa, Dallas, New Orleans, Shreveport



Greatest Name in Cable Tools

Acme

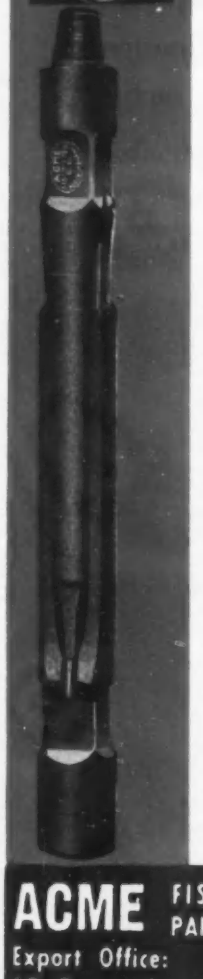
TRUSTWORTHY SINCE 1900

Delivers the Drilling World's MOST FOOTAGE Drilling Jars

(Fig. 105) Weldless, of alloy steels. Heat-treated for greatest toughness. DOUBLY outwear welded Jars. Prevent Jar-troubles that cause COSTLY fishing jobs.

Cylindrical construction means more "stock;" greater wearing surfaces; added strength. Swivel action assures free-tool turning; good hole.

Every inch, the Drilling World's FINEST Jars . . . Made under most favorable Jar-making conditions, by long-seasoned Jar-specialists.



(Fig. 107) Making welded Jars — of PREMIUM grade steel, correctly heat-treated — is the work of full-time, long-experienced Jar-crews at Acme. Throughout heating, forging and welding, their pride-of-craft abilities are coordinated in fashioning a superior quality product.

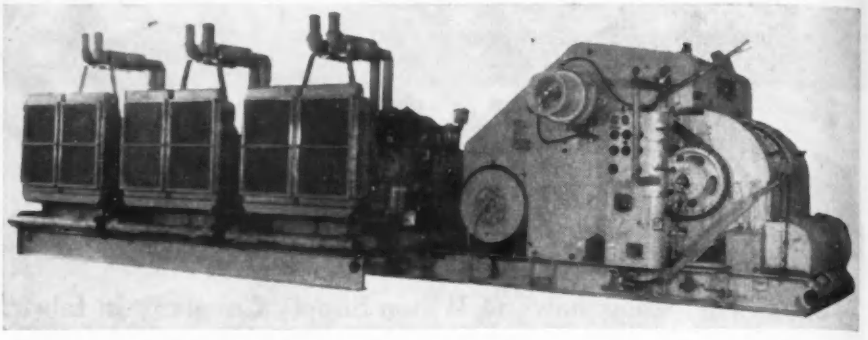
Buy welded Jars on a comparative Jar-service basis . . . and you'll buy Acme's 9-times-in-10.

Write for Complete Information — including prices — on these SUPERIOR Acme Cable Tools.

ACME FISHING TOOL CO.
PARKERSBURG W. VA.
Export Office:
19 Rector St., New York 6, N.Y.

Cardwell Manufacturing Company, Inc. Block Q

NEW PRODUCTS DISPLAYED:



The New Model O, 10,000 ft. Draw Works is powered by three General Motors 12107 engines with Allison torque converter. It is equipped with Air-Disc drum clutches which are mounted in the drilling and sand line drums without increasing the rig width or reducing drum length.

Circle No. 304 on Postcard, Page 316

The New Model G Double Drum Draw Works is designed for 4500-foot drilling and up to 10,000-foot workovers. It is equipped with air-controlled Flex-Disc and Air-Disc clutches and incorporates the use of the torque converter with a special Torqumatic transmission.

Circle No. 305 on Postcard, Page 316

The New "A" Series Rigs, one of which is the AL drilling rig, has a 65-foot, four-leg, telescoping mast with a capacity of 75,000 pounds hooked load. This unit is a highly mobile shallow well drilling rig and is powered with a General Motors 4031-C Engine. Another version of this "A" series is the Model AH Double Drum Servicing Hoist which has a single-leg 55-foot mast. This unit is powered by a Waukesha motor 140GK engine.

Circle No. 306 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Various Models of Draw Works and Workover Rigs; Flex-Disc Clutches; Air-Disc Clutches; Servicing Hoists, Portable Masts.

ACME DRILLING & FISHING TOOLS

There's More of EVERYTHING You Need in Acme Tools...

Acme's famous "Drilmor" Line not only provides a tool for every drilling or fishing operation but each tool possesses more of the finer functional features and superior product qualities you need for better in-hole results . . . because specialized toolmanship of over half-a-century accounts for the difference.

Visit Our Space — 47-48 Calif. Bldg. Int. Oil Show, Tulsa, May 14-23.

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION MEMBER

C-O-Two Fire Equipment Company

Booth 38, Oklahoma Building

NEW PRODUCTS DISPLAYED:

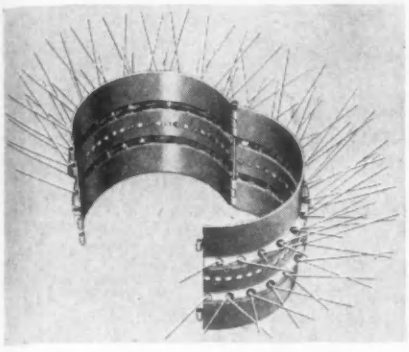
The New Dry Chemical Type Wheeled Portable Fire Extinguisher is easy to operate, compact, well-balanced, and offers extensive maneuverability indoors or outdoors. The design renders constant free flowing dry chemical. The fire extinguisher is partially inverted for wheeling, then fully inverted at fire scene, which changes the position of the dry chemical in the tank and thereby provides mechanical breakage. This mechanical breakage feature, plus a continuous nitrogen pressured agitation or fluffing, together with a free flowing dry chemical gives a faster, more effective and complete discharge.

Circle No. 307 on Postcard, Page 316

Baker Oil Tools, Inc.

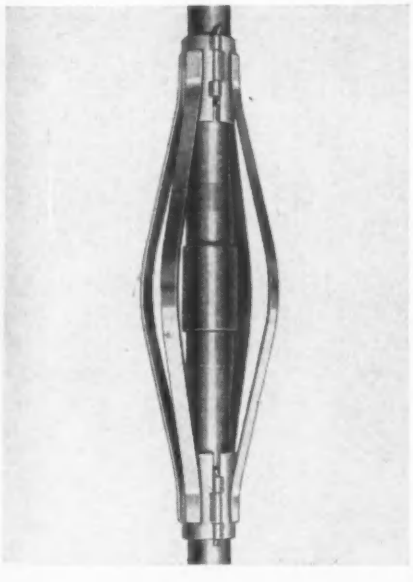
Booths 99-102, 111-112, Oklahoma Building

NEW PRODUCTS DISPLAYED:



The New Baker Scratcher has the scratcher wires mounted at an upward pitch and during the running-in operation, they tend to fold upward against the OD of the casing. This prevents the scratcher from removing valuable mud cake or destroying its effectiveness as the casing is being run in. Two complete rows of scratcher wires are provided to assure a more effective removal of mud cake and gelled mud throughout the entire interval to be cemented. The scratcher is hinged for quick and easy installation and is available with regular length scratcher wires for normal clearance programs as well as with shorter length scratcher wires for slim hole clearances.

Circle No. 308 on Postcard, Page 316



The New Tubing Centralizer incorporates the Baker Hinge-Lok feature. It may be installed around a coupling on either plain end or upset tubing as it is run in the well, eliminating the need for the welding of stop rings.

Circle No. 309 on Postcard, Page 316

New Differential Fill-Up Shoes and Collars permit the well fluid to fill the casing from below, but so regulate the amount of fill that the height of the fluid column in the casing always remains safely less than the total length of casing run.

Circle No. 310 on Postcard, Page 316

THE EASIEST WAY TO MAKE ENDS MEET

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FOR *More Information* ON PRODUCTS ADVERTISED

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Byron Jackson Company

Block 102 and Booths 209-210 Oklahoma Building

NEW PRODUCTS DISPLAYED:

BJ Unimatic Hook-Block is a completely new unitized hook and traveling block featuring a unique hook positioner and a flexible connection between the block and hook. The newly developed hook positioner has an arm carrying a cam follower which can be locked at any angular position with respect to the traveling block. This feature is used to rotate the elevators into the correct position for the derrickman to catch the next stand while going in the hole. The hook also incorporates a hydraulic shock absorber and has a flexible connection between the block and hook.

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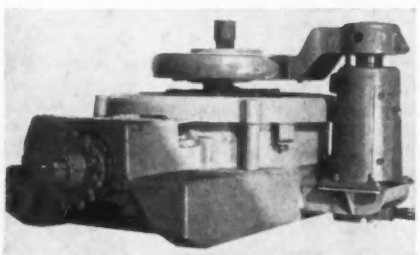

The New Type B Unitized Power Slips feature compactness in design, portability, pressure centering of pipe and double safety guards. Other important qualities include anti-friction bearings for long service life; a side opening feature which permits quick placement of slips around pipe; and free action of slips to rotate with rotary table without roller bearing contact with slip ring. Any tools or equipment which can pass through the master bushing can be run through the Type B Slips when in raised position.

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It's a lot easier to work with

RIDGID

Extra-Utility Pipe Vises

Compare those work-saver RIDGID Vises with any others and you see the bonus of extra utility you get for your money. Kit vise is easily toted to the job, quickly clamped on edge of bench or plank, ready to use. All other RIDGID vises have handy integral pipe benders and rests to make cutting and threading easier. Full-width firm-gripping jaws of top quality tool-steel, bodies of rugged special malleable—for years of service. 9 models, yoke and chain, 23 sizes, meet every need. Get your money's worth—buy RIDGID Vises at your Supply House.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO

RIDGID

Work-Saver Pipe Tools

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Stratigraphic Well logging. Well sitting. Subsurface problems and property evaluations.

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Complete coverage of base and development maps of the Rocky Mountain Region.

MAPS

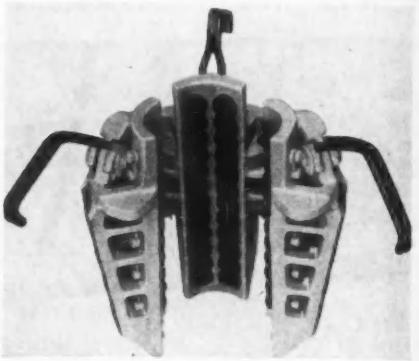
CHEMICAL & GEOLOGICAL LABORATORIES

Laboratories at Casper, Midland, Glendive and Edmonton

Web Wilson Oil Tools, Inc.

Booths 87, 88, 123, 124, Oklahoma Building

NEW PRODUCTS DISPLAYED:



Web Wilson Drill Pipe Slips are equipped with patented buttons mounted to move slightly and take a positive grip on drill pipe without imposing unequal strains on the buttons or backing slips. This freedom of adjustment enables the buttons to take a uniform, non-slipping grip without causing deep indentations which often lead the way to pipe failure. Permitting the buttons to adjust themselves also insures quick, easy release.

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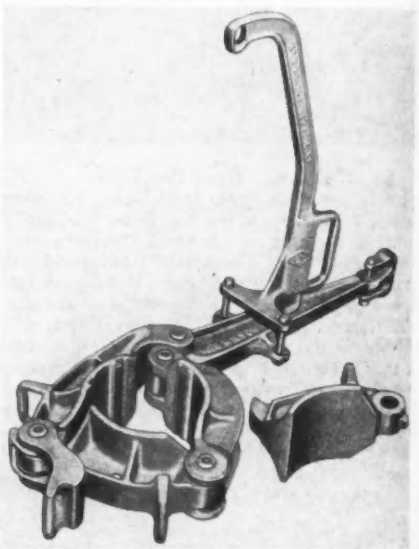
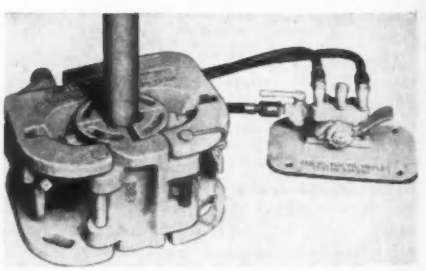


The Deep Face Casing Tong is equipped with four die slots, each containing two tong does 4¼" long, making a total of 8 dies contacting the casing with a uniform, non-crushing grip. It is necessary to change only the lug jaw to handle all casing sizes from 9⅝" through 13⅜".

Circle No. 314 on Postcard, Page 316



Web Wilson Power Tubing Spider has removable slip inserts to insure positive setting and support of the longest tubing

strings as well as quick, easy release the slips are raised. Other features include unitized slip construction; two-way foot pedal operation (adjacent to or removed from the well head); fast operation with minimum air pressure; and safe gripping without damage to the tubing.

Circle No. 315 on Postcard, Page 316

The New Hydra Hook has a hydraulic piston feature which makes it softer in action; bouncing of tool joint pins in the box is eliminated; and damage to threads is practically impossible.

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OTHER PRODUCTS DISPLAYED:

Heavy Duty Rotary Tongs; "Tiger Tooth" Tong Dies; Sucker Rod Elevators; Forged Elevator Link.

National Tank Company

W of Block S

PRODUCTS DISPLAYED:

Complete Closed Type Water Disposal System; Horizontal Emulsion Treater; Horizontal Non-Corrosive Emulsion Treater; Model R Emulsion Treater; Horizontal Double Barrel High Pressure Horizontal Separator; 1000 PSI 4B1 Oil and Gas Separator; 250 Barrel Tank for Corrosive Storage; Glycol Dehydrator; 5M LTX Unit with Glycol Injection, Classifier Section, Desorber and Reconcentrator; Monotube Stage Separation Unit; Low Pressure Steam Boiler; Combination Separator and Booster; Spiral-Welded Casing; Diatroller; Non-Freeze Pilot Regulator; Non-Corrosive Pop Valve; Double Seated "O" Ring Valve.

K & G Oil Tool and Service Company

Block 207, North Extension

NEW PRODUCTS DISPLAYED:

The K & G Magnetic Fishing Tool is a permanent magnet type fishing tool designed for removing hard-to-recover metallic junk. The tool's magnetic field is controlled and localized directly at the pole plate. The magnet, composed of an ultra-magnetic material developed by General Electric, picks up from 250 to 1200 pounds, depending upon the size of the tool used. The K & G Magnetic Fishing Tools are available in a variety of sizes on a rental basis.

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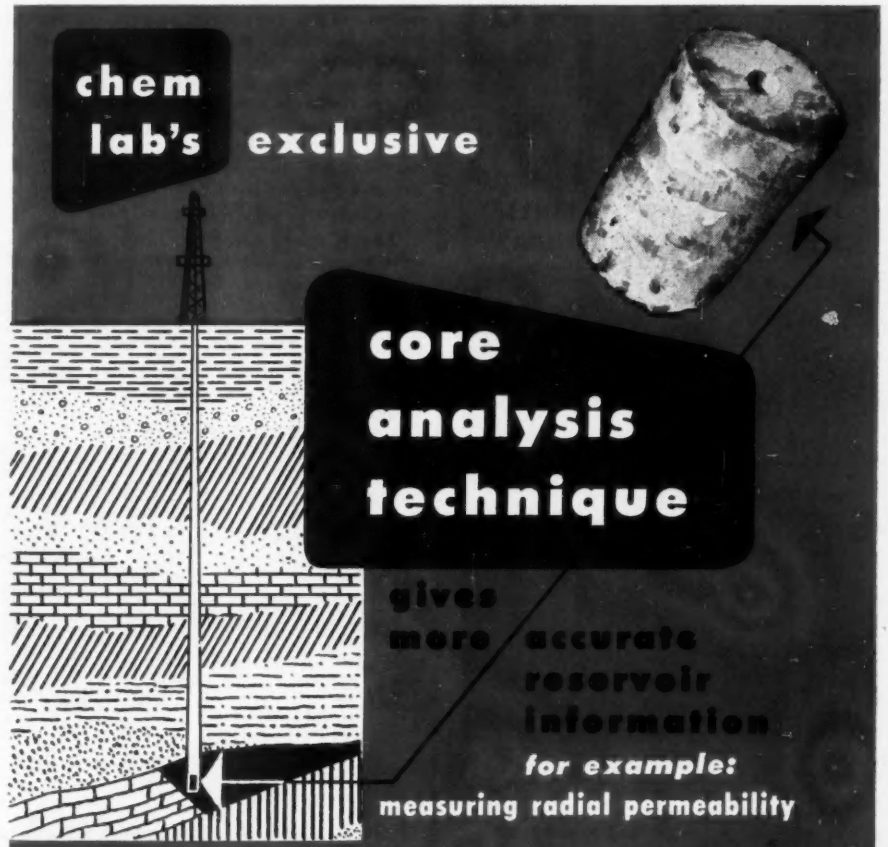
Magnetic Fishing Tool

Diamond Core Barrel Magnet

The K & G Diamond Core Barrel Magnet is designed to run inside of inner barrel of various makes, types and sizes of core barrels. The tool is so constructed that when it is inserted in the diamond core barrel, the magnetic field is directly at the



Chem Lab's Full Diameter Corestudy is a core analysis technique applied to the full diameter of the core, not just a plug, regardless of core barrel size . . . the only method which can measure the effect of cracks, fractures and vugs. Chem Lab is the only commercial laboratory using a specially developed technique whereby a vertical hole is bored in this full diameter core. The specimen is sealed top and bottom in special apparatus and air applied around the entire outer surface is metered off the vertical hole—duplicating in miniature the movement of oil from the formation to the bore hole. Thus, an accurate measurement of radial permeability is obtained, giving a truer, more representative and more realistic picture of the reservoir rock condition.

Here's Proof from the files

TYPE OF PRODUCING FORMATION: LIMESTONE

METHOD OF ANALYSIS	CONVENTIONAL PLUG	CORESTUDY FULL DIAM.
Footage analyzed	106	106
Specimens analyzed	106	33
Total porosity—feet	692	668
Total millidarcy—feet	454	13,819
Footage of 0.1 millidarcy & higher	35	60.4
Total volume of specimen analyzed in cu. in.	47	1,904
Cost of analysis (porosity and permeability)	$396	$218

Result: Full Diameter Corestudy Analyzed 40 times more volume of specimen at 45% lower cost.

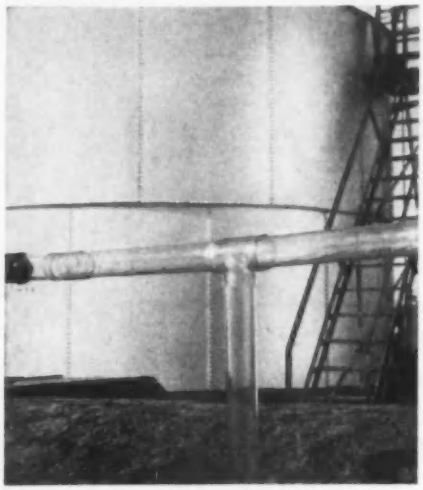
WRITE FOR FREE COPY of new technical paper on Full Diameter Core Analysis Methods

CHEMICAL & GEOLOGICAL LABORATORIES

Laboratories at Casper, Midland, Glendive and Edmonton

KRALOY
PIPE & FITTINGS

FOR WASTE WATER LINES, FLOW LINES, GATHERING LINES



No Corrosion!

Kraloy will not rust, is impervious to all types of soils, and is not subject to galvanic corrosion.

No Wax Build Up!

Kraloy has no affinity for waxes or paraffin.

Eliminates Scale

Practically all types of mineral deposits are eliminated.

Low-Cost Installation

Two roustabouts can lay 1000 feet of Kraloy per hour. No welding or field wrapping is necessary.

★LIGHT-WEIGHT. Easier to handle. 8 times lighter than steel.

★MANUFACTURED to IPS sizes.

★TREMENDOUSLY GREATER carrying capacity than steel pipe due to smooth, frictionless walls.

Over 4,000,000 feet of Kraloy now in use. Type 0—125 PSI W.P. Max. Type D—500 PSI W.P. Max.

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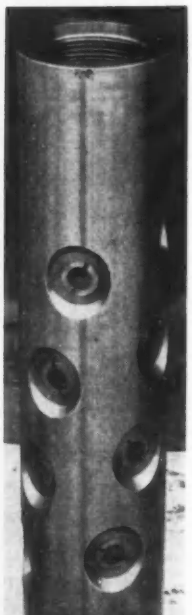
bottom of the core head, to pick up broken teeth, bearings, tong dies or any other small junk on the bottom of the hole. As the core is cut, the K & G Core Barrel Magnet travels up the inner barrel, carrying with it all junk recovered from the bottom of the hole. K & G Core Barrel magnets are now available on rental basis in most popular sizes.

Circle No. 318 on Postcard, Page 316

The K & G Overshot Magnetic Fishing Tool is designed to recover junk that lies between tubing and casing. The tool has an inner floating magnet to recover junk which might lay on top of tubing. By use of overshot extension pipe, this tool may be run at various depths below the top of the tubing, depending upon the location of the fish.

Circle No. 319 on Postcard, Page 316



Magnetic Junk Sub

The K & G Magnetic Junk Sub is designed to run between bit and drill collars, with controlled field magnets recessed into the sides of the sub to eliminate wiping off of junk as string is rotated or removed from the well bore. The magnets are so spaced that all junk must pass directly into the magnetic field, which permits picking up all small junk which might be washed off bottom and suspended in the fluid column.

Circle No. 320 on Postcard, Page 316

The Lincoln Electric Company

Booths 201, 202, 249, 250, Oklahoma Building

NEW PRODUCTS DISPLAYED:

A New Line of AC Welding Machines consist of new industrial models of 300, 400 and 500 ampere capacity in a more compact design. The large front mounted amperage dial is illuminated by an accessible 6 volt lamp. A gear driven crank makes easy and smooth setting of amperage. An improved downdraft ventilation system brings air in from the top of the case, circulates it by baffles through the windings and prevents any air from being recirculated. All electrical and mechanical control parts required for connecting or that need maintenance are accessible without removing the case. The large lift bale on top of the case accommodates a standard crane hook.

Circle No. 321 on Postcard, Page 316

A Hardsurfacing Flux for hardsurfacing with automatic hidden arc welding, uses a standard mild steel electrode wire. The hardsurfacing elements are contained in the flux and alloyed in the arc.

Circle No. 322 on Postcard, Page 316

The Twin-Arc Process of Hidden Arc Welding involves the use of two arcs mounted in tandem to deposit metal into a single crater.

Circle No. 323 on Postcard, Page 316

Hercules Tool Company

Booths 7-9, California Building

NEW PRODUCTS DISPLAYED:

The Hercules Polished Rod-Clamp-Off Support is constructed from high grade malleable iron having an expected tensile strength of 55,000 pounds psi and will accommodate all sizes of polished rods and liners to and including 1¾-inch OD. The support rests upon the top of the stuffing box body and transmits the weight of the rods and clamp through the body of the stuffing box to the tubing. No weight is placed upon the packing or other components of the stuffing box.

Circle No. 324 on Postcard, Page 316

Type "WF" Tubing and Casing Head is made of electric cast steel in 4½- to 8⅝-inch OD sizes and will support 1-inch tubing to 5½-inch OD casing. It is especially designed for water-flooding projects and has no casing thread connection as the head rests on casing or collar.

Circle No. 325 on Postcard, Page 316

Type "SOS" Stripper Tubing Head has three-piece hinged slips and overhead neoprene packing arrangement. All parts interchange in top and bottom section. Designed for hydrafracing, acidizing, and for use on flowing wells, it is made to fit all sizes from 4½- to 7-inch OD full opening. Male, female, or oil saver top adapters are available for all sizes.

Circle No. 326 on Postcard, Page 316

Type "SO" Tubing Head consists of bottom section of "SOS" stripper tubing head. Neoprene tubing stripper can be installed in body of this tubing head instead of slips and packing, on semi-flowing wells, while running or pulling tubing.

Circle No. 327 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Split Cone Packing Rings; Duplex Polished Rod Stuffing Box; Lubricating Upper Gland; Thread Pumping and Flowing Tees; Special Cross Tees; Tubing Hangers; Tubing Heads with Slips; Tubing Heads; Casing Heads with Slips; Casing Heads; Tubing Spiders; Casing Head Adapters.

Crane Company

Booths 196, 197, 254, 255, Oklahoma Building

PRODUCTS DISPLAYED:

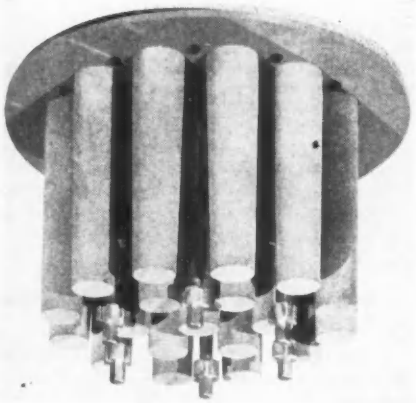
Pipe Line Gate Valves; Small Steel Valves; Fittings; Pipe Plumbing and Heating.

Permanent Filter Corporation

Block 9 (Bethlehem Supply Co. Booth)

NEW PRODUCTS DISPLAYED:

Filterall is a new permanent-type all-metal filter, which needs no replacement of packs or cartridges, and is designed to filter solids from all liquids or gases and strip water from various liquids. Based on an entirely new principle a complete line of industrial filters has been developed, and is now available, for every single filtration application in the petroleum industry. The Filterall element in all its various shapes and sizes is molded of carefully sized, spherical shaped metal particles, sintered under atmospherically controlled conditions. The result is a porous metal, the



degree of porosity (uniform size of pores) being dependent on the size of the spherical particles. Filtration removing all contaminates over 2 microns (39 millionths of an inch) from any liquid can now be practically accomplished with a minimum pressure drop. The element can be completely rejuvenated by periodical cleaning in gasoline, kerosene, or industrial cleaning solvents. When used for filtration of lubricating oils, Filterall does not remove any of the detergents or additives. It will only remove all abrasive and harmful sludge.

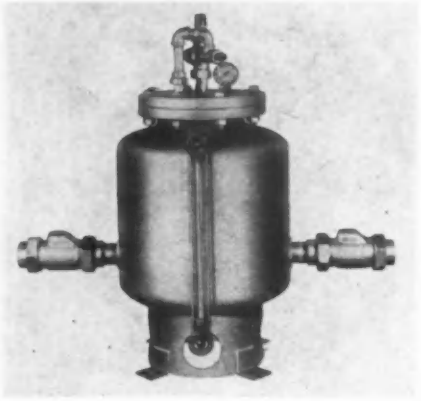
Circle No. 328 on Postcard, Page 316

More than a mere pipe fitting!
catawissa
PERFECT SEAL
unions
give a 3 to 1
safety factor
PLUS
A PERFECT SEAL!
THERE'S A CATAWISSA PERFECT SEAL UNION FOR EVERY USE . . . ALL TEMPERATURES, ALL PRESSURES!
The full dependability of HOT FORGED STEEL is yours in a Catawissa Union (hot forged from solid steel bars) with several extra value features that are exclusive here at the UNION SPECIALISTS!
All Catawissa Unions are designed to give a 3-to-1 SAFETY FACTOR . . . 3,000-lb. service unions are tested to 9,000-lbs., 6,000-lb. service unions tested to 18,000-lbs., etc.
Exclusive Ball-to-Angle seat design assures a PERFECT SEAL even when the pipe is not in alignment!
Machining operations assure a UNIFORMITY AND ACCURACY heretofore found only in special fittings and, with rigid inspection both during and after machining, guarantees LEAKPROOF CONSTRUCTION!
Satisfaction is guaranteed in any application—whether it be general low pressure service or extremely high pressures and temperatures (for air, oil, gas, chemicals, hot oils, gases or steam).
WRITE FOR CATALOG 11
AVAILABLE FROM LEADING INDUSTRIAL SUPPLY FIRMS
CATAWISSA VALVE & FITTINGS COMPANY
60 MILL ST. ★ CATAWISSA, PENNA.

Penberthy Injector Company

Booth 13N, North Extension

NEW PRODUCTS DISPLAYED:

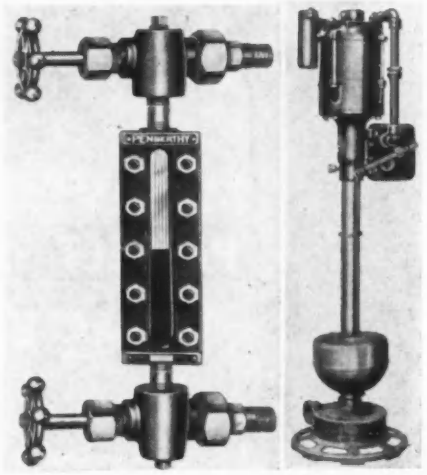


Penberthy Cycling Jet Pump can lift by suction and discharge against heads approximately equal to the gas, air or steam pressure used. Other than the float-controlled operating valve and two check valves, there are no moving parts. It is used in injecting chemicals into vessels or fluid lines, transferring fluids from one location to another, pumping fluids through process or treating vessels, and pumping operations in hazardous locations.

Circle No. 329 on Postcard, Page 316

Penberthy Gage Valves With Floating Shank solves the very annoying gage installation problem of drilling and tapping the vessel to exact center-to-center dimensions within allowable tolerances. The floating shank has the union connection between tail pipe and valve body so designed that variations up to ⅜" are possible in center-to-center of vessel tapping. Stresses induced by dimensional variation are eliminated.

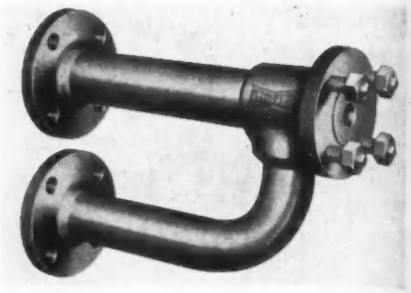
Circle No. 330 on Postcard, Page 316



Gage Valve — Sump Pump

Penberthy Explosion Proof Electric Sump Pump is a float-controlled automatic electric sump pump with totally enclosed explosion proof motor and switch. Motor and switch have Underwriters approval for hazardous locations including gasoline, solvent vapors, metal dust, natural gas, carbon black, naphtha, alcohol, grain dust, acetone, lacquer, coal and coke dust. Motor is ⅓ hp capacitor type. Rated capacity is 4000 gph against 1 ft. discharge head.

Circle No. 331 on Postcard, Page 316



Penberthy Eductors use air, steam, water or other fluid under pressure to pump various fluids. They have no moving parts, no packing glands and require no lubrication. They are used for raising or transferring fluids, exhausting chambers, mixing and blending, and solvent extraction.

Circle No. 332 on Postcard, Page 316

The General Electric Company

Booths 241-244, Oklahoma Building

PRODUCTS DISPLAYED:

A typical oil-pumping operation showing a 7½ hp Tri-Clad motor, a three-phase, 60-cycle capacitor, and metering devices; G-E Gas Turbine for Gas Pipe Line Pumping; Turbine Blades and Buckets; G-E Swing-Out Type AK-1 Breaker; SB-1 Switch; Load Visualizer; Time Switch; Zahn Viscosimeter; Cutaway Model of a G-E Mechanical Drive, Single-Stage Steam Turbine; Pushbutton and Selector Switches; Starters for NEMA 7a Enclosures; and Oil-Immersed Starters in NEMA 8 Enclosures.

Link-Belt Speeder Corporation

Booths 3 and 4, Silver Lane

PRODUCTS DISPLAYED:

Complete Line of Crawler, Truck and Wheel-Mounted Shovel-Cranes; K-375 2-yard Combination Shovel, Clamshell, and Dragline; "Speed-o-Matic" Power Hydraulic Control Systetm for Shovel-Cranes.

Central Scientific Company

Booths 8, 9, 10, Scientific and Technical Building

PRODUCTS DISPLAYED:

Tensiometer; Waring Blendor; Hotcone Electric Heaters; Moisture Balance; Hypervac Pump; Megavac Pump; Hyvac Pump; Supervac OD-25 Vacuum Pump; Ovens; and "Lab Jack."

The Refinery Supply Company

Booths 8, 9, 10, Scientific and Technical Building

PRODUCTS DISPLAYED:

Super Pressure Cement Consistometer; Recording Gravitometer; Specific Gravity Balance; Dew Point Tester; Dew Point Recorder; Super-Compressibility Apparatus; Standard Dead Weight Gauge; High Pressure Dead Weight Gauge; Portable Standard Dead Weight Tester; Portable High Pressure Dead Weight Testers; Pressure Hydrometer Jar; and Holmes Portable Gas Testing Absorber.

Union Wire Rope Corporation

Booths 66, 80-82, 129-131, Texas Building

PRODUCTS DISPLAYED:

Tuffy Rotary Lines for both jackknife and standard rigs; Union Wire Rope Ton Mile Indicator; Tuffy Slings.

a Bigger, Better WISCONSIN
HEAVY-DUTY Air-Cooled
ENGINE
16% More Power For Your Equipment
The NEW Model VG4D 25 to 36 H.P.
MORE Power TO FIT THE JOB
MORE Power TO FIT THE MACHINE
Complete Power Unit with Clutch Reduction.

Another engineering achievement . . . the NEW Model VG4D V-type 4-cylinder Wisconsin Heavy-Duty Air-Cooled Engine, increasing the power range to 36 hp. — a power gain of more than 16% over the VP4D, former top engine in the line.

The NEW Model VG4D is an exceptionally smooth-running, even-firing engine. Its light weight and compactness in design simplify the problem of engine installation on modern equipment where weight and space limitations are important factors.

Every one of the traditional Wisconsin 4-cylinder features are built into this new model. These include, to name a few, tapered roller main bearings, dynamically balanced forged crankshaft, mirror finish on crank pins, Stellite-faced exhaust valves and valve seat inserts and honed cylinders for long, dependable, heavy-duty engine life.

The Model VG4D engine is definitely Tops in Performance, delivering a maximum of power per pound of engine weight, at minimum operating and maintenance costs.

We invite your request for complete detailed specifications.

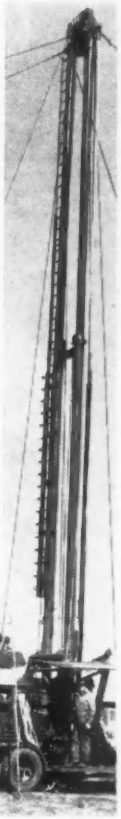
WISCONSIN MOTOR Corporation
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

WRITE TO HARLEY SALES CO.
619 S. MAIN STREET, TULSA, OKLAHOMA
M & M BUILDING, HOUSTON, TEXAS
505 SOUTH MAIN ST., WICHITA, KANSAS
OIL FIELD DISTRIBUTORS FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS.

Walker-Neer Manufacturing Co., Inc.

Block 202

NEW PRODUCTS DISPLAYED:



The Walker-Neer Spudder, Model S-43, for 3000-foot top-to-bottom drilling and 4000-foot workover, has a V-belt driven metal band wheel mounted at center of frame for maximum strength and power, a full width calf reel with double six-inch brakes, and a separate mast hoisting drum and control. Each drum has its own disc-type drive which allows operation without shifting pinions, gears, or levers. Other features include: V-belt drive from engine to clutch shaft, exclusive "Tor-Shock" (Rubber Torsion) shock absorber, traveling spudding sheaves, all ball and roller bearing construction, and superior tandem axle.

Circle No. 333 on Postcard, Page 316

McCartney Engineering and Research Corporation, Inc.

Booth 91N

NEW PRODUCTS DISPLAYED:

The Automatic Tank Transfer Valve is a float-operated double acting valve. It can be set to fill each tank in the battery or any tank can be bypassed. As any tank is filling, the flow is prevented from passing to the next tank. As the tank is filled the valve automatically stops the flow into that tank and opens the flow to the next tank in the battery to be filled. All moving parts and guide surfaces are made from or lined with phenolic plastic tubing which resists severe corrosive conditions.

Circle No. 334 on Postcard, Page 316

Gunnison Homes, Inc. – United States Steel Corporation

Block 2

NEW PRODUCTS DISPLAYED:

A Modern Type, Quickly Erected Home can be bought for as little as $6300 excluding lot. The oil man can purchase as few as two houses, have them shipped direct from the factory to the nearest railroad siding point, then truck them to an isolated drilling location where they can be erected under all types of field conditions. They can be moved from one site to another with a minimum of damage and cost.

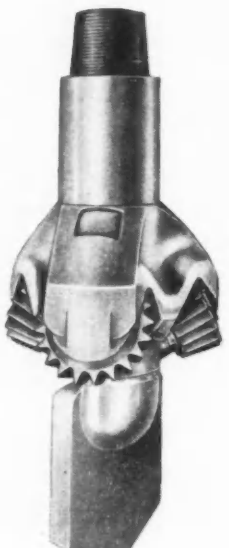
Circle No. 335 on Postcard, Page 316

Buy
A
ALTEN
PUMPING UNITS
for . . .
BEST HELICAL GEARS
COMPLETE PRETESTING
HARDEST GEAR SURFACES
You can avoid shutdowns before they occur and roll up more income producing hours if you pump with Alten units. Each is thoroughly pre-tested before being shipped to the field. And that's only part of the story. Specially hardened Alten helical gears are the best ever developed for pumping purposes. Get enduring service at full rated capacity—buy Alten at your supply store.
— ALTEN —
Foundry & Machine Works, Inc.
LANCASTER, OHIO
SALES OFFICES
Lancaster, Ohio
Olney, Illinois
Hutchinson, Kansas
Duncan, Okla.
Abilene, Texas
Houston, Texas
Casper, Wyoming
Edmonton, Alberta, Canada
EXPORT OFFICE
New York City
WAREHOUSES
Lancaster, Ohio
Wichita Falls, Texas
Houston, Texas
Casper, Wyoming
Edmonton, Alberta, Canada

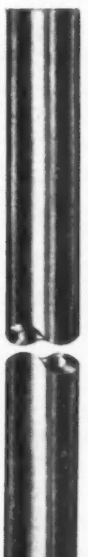
For high speed drilling

USE CP DRILLING TOOLS

CP THREE CONE ROCK BITS are furnished in five types: for drilling in the softer shales and unconsolidated formations, Type ES-2; for soft to medium formations, Type ES-3; for hard sands, hard shales, Type EM-2; for rocks of high compressive strength, Type EM-3 (illustrated); for exceedingly hard, abrasive formations, Type EH-1.



C-1 REAMING BITS for a smooth running, fast cutting, straight hole reaming job. Properly placed pilot blade guides reaming bit, assures concentricity of large hole with pilot hole. Unitized welded-in cutters prevent loose parts from falling off in the hole. Hard-faced cutters on ball and roller bearings give maximum cutter life.



CP DRILL COLLARS are turned on the outside diameter concentric with the bored hole. The steel is carefully selected for hardenability to develop maximum hardness in the center section. High impact values assure toughness to withstand shock loads. Vertical quenching for the entire length creates uniform hardness throughout.

Oil Tool Division Office: One N. W. 16th Street, Oklahoma City, Oklahoma

In Canada: 10103 81st Avenue, So. Edmonton, Alberta, Canada • In Mexico: Mexico, D. F., Rosas Moreno No. 41; Tampico, Tamps., Apartado No. 174.
Special Oil Tool Export Agent: E. F. Gahan, Inc., 500 Fifth Ave., New York 17, N. Y. (West Indies, Central and South America, exclusive of Mexico)

Universal Atlas Cement Company – United States Steel Corporation

Block 2

NEW PRODUCTS DISPLAYED:

Unaflo, Special Oil Well Cement, is specially made to provide the driller with a slurry that pumps easily and sets hard. Initial thickening is postponed to allow ample time for proper placement of cement, plus a margin of safety for unforeseeable delays or emergency shutdowns, then hardens quickly and is resistant to sulphate waters.

Circle No. 336 on Postcard, Page 316

American Steel and Wire Division – United States Steel Corporation

Block 2

NEW PRODUCTS DISPLAYED:

A New Ton-Mile Calculator Chart, offered without cost, is the first new one produced in some time and a significant advancement over present calculators.

Circle No. 337 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Preformed Rotary Drilling Lines; Sand and Coring Lines; Cable Tool Drilling Lines; Tapered Drilling Lines; Oil Field Wire Rope; and Extensive Line of Wire Rope Products.

U. S. Steel Products Division United States Steel Corporation

Block 2

NEW PRODUCTS DISPLAYED:

A New Drum Cleaning Process provides a drum that is completely clean, scale-free and rust-inhibited. The new process offers maximum protection from contamination by impurities from the drum.

Circle No. 338 on Postcard, Page 316

LeBus Rotary Tool Works, Inc.

Booth 71, Texas Building

PRODUCTS DISPLAYED:

Load Binders; Snatch Blocks; Winch Line Tail Chains; Industrial Hooks; Connecting Links; and Fishing Tools.

LeBus International Engineers, Ltd.

Booths 70 and 71, Texas Building

PRODUCTS DISPLAYED:

LeBus Grooving and Controlled Wire Line Spooling System showing the difference between controlled pyramid spooling and the conventional type helical spooling of wire lines.

Empire Pattern and Foundry Exhibit

Booths 257 and 258, Oklahoma Building

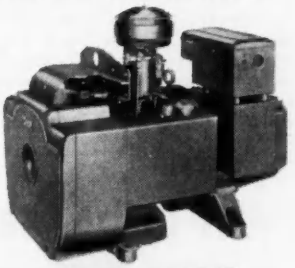
PRODUCTS DISPLAYED:

Castings of various Types and Sizes in "Meehanite" Metal, Bronze, and Aluminum; Permanent Molds and Castings; Pressure Cast Match Plates.

The STANDOUT ELECTRIC PLANT for STANDBY ELECTRIC POWER

the New **ONAN "CW"**

(5,000 & 10,000 WATTS)

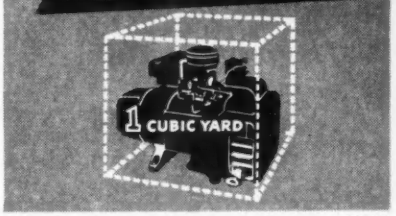


QUIET RUNNING

10CW—*10,000 watts A. C.* High standby capacity for hospitals, hatcheries, schools, stores, plants.

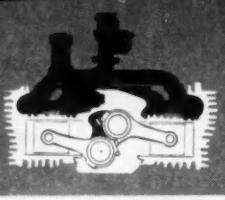
5CW—*5,000 watts A. C.* For homes, farms, police radio, micro-wave relay stations, etc.

COMPACT



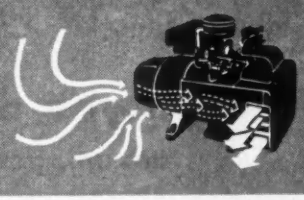
Takes less than one cubic yard of space. 10KW model requires only half the space of ordinary 10,000-watt plants. Easier to install. Connection box provided for quick hook up.

BUILT FOR HEAVY DUTY



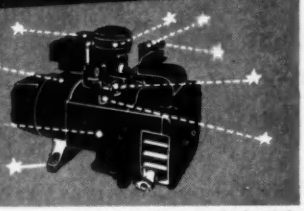
Smooth running twin-cylinder, horizontally-opposed, 4-cycle air-cooled engines deliver rated horsepower at moderate speed. Unusually large bearing surfaces for long life

UNI-DUCT COOLING



Cooling air is drawn by vacuum through generator and over engine. All heated air expelled through one small vent which also discharges engine exhaust. Quiet operating.

DE LUXE EQUIPMENT



Nothing extra to buy. Impulse-coupled, high-tension magneto, radio shielded. Oil-bath air cleaner, fuel filter, oil pressure gauge, fuel tank, muffler and exhaust tubing.

COSTS LESS THAN ANY OTHER COMPLETE ELECTRIC PLANT! The Onan "CW" combines exclusive design advantages with all the time-proved Onan features such as UNIT-BUILT CONSTRUCTION, *yet it costs less.* Get the complete story of this sensational, all-new electric plant.

Write for detailed specifications!

D. W. ONAN & SONS INC.

Onan ELECTRIC PLANTS

5977 UNIVERSITY AVENUE S.E., MINNEAPOLIS 14, MINNESOTA

RUGGED— ACCURATE— EFFICIENT!

#3480
100 C.C.
CENTRIFUGE

You can maintain your required speed for the full period of the test with much less effort. Curtin centrifuges, proven world-wide, are heavy duty, rigidly constructed, and extremely simple in design. Illustrated bulletin, giving full details, available upon request.

W·H·CURTIN & CO.
HOUSTON .... NEW ORLEANS.

PERFORATE TUBING IN THE WELL

KINLEY TUBING PERFORATOR

M. M. Kinley Company Licensees

BEAUMONT
Associated Engineers, Inc. 5-7046, ZF 8-2023
CASPER
Wire Line Service 3-5264
CORPUS CHRISTI
Tubokut Wire Line Service 5-1811
Tuboscope 3-3512, 4-3137
HOBBS
Cecil Horne 3-5396
HOUSTON
Tuboscope JU-0577, MO-4279
KILGORE
Tuboscope 5198, 5218
MIDLAND
Luccous 4-8471, 4-4320
NEW IBERIA
Tuboscope 2-3831, 4-1327
NEW ORLEANS
Associated Engineers, Inc. AU-7696
OKLAHOMA CITY
Rainbo Service Co. . . . ME 4-2131, ME 2-2024
SHREVEPORT
Tuboscope 2-5663

Technical Oil Tool Corporation

Booths 192 and 193, Oklahoma Building

NEW PRODUCTS DISPLAYED:

Totco's New Double Recorder is a mechanical, self-checking drift indicator.
Circle No. 339 on Postcard, Page 316

The Totco Directional Recorder is a new mechanical, double-checking directional, single-shot recorder.
Circle No. 340 on Postcard, Page 316

The Initial Boiling Point Recorder for light hydrocarbons maintains a current record of the initial boiling point of the material as it is being produced, thus making it possible to alter the plant controls at any time changes occur.
Circle No. 341 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Chronometric Tachometers; Flash-Tronic Batteryless Synchronizers; Auto-Clip Applier and Auto-Clips.

Reo Motors, Inc.

Block 202

PRODUCTS DISPLAYED:

Spark Ignition Industrial Engines for use with Gasoline, Natural Gas Fuel, Liquefied Petroleum Gas or Dual Fuel Carburetion; Line of Industrial Engines.

Chicago Pneumatic Tool Company

Block A

PRODUCTS DISPLAYED:

Three Cone Bits; Jet-Piercing Bits; Reaming Bits; Tool Joints; Drill Collars; Stabilizing Reamers; Junk Baskets; Chippers; Scalers; Grinders; Masonry Drills; Light Demolition Tools; Rivet Busters; Rivet Cutters; Impact Wrenches; Tube Rollers; Sump Pumps; Sludge Pumps; Utility Wrenches; Rotary Compressor-Trenchdril Combination; Sinker Drills; Demolition Tools; Backfillers; Earth Compaction Tools; Pumps.

Midwestern Engine and Equipment Company, Inc.

Block 123

PRODUCTS DISPLAYED:

Trenchoe; Tractair with a Patch Drill; Oliver OC 18 with a BX-6 Berg Side Boom holding a LeRoi-Cleveland Pipeliner Special Drill; 600 cubic foot LeRoi Compressor; Oil Field Type Duplex Power Pump; Midwestern Engineered Beacon Light Plant; Unit Crane and Shovel cutaway display gear case; Hydrolift; Chinook Wind Space Heater; Midwestern Water Hog Pump.

The S. M. Jones Company

Booths 15 and 16, Oklahoma Building

PRODUCTS DISPLAYED:

Dardelet Self-Locking Pin Threads; Conical-Shouldered Joints; Wescott Undercut; Hollow Sucker Rods; Bronze, Monel, Stainless Steel, Nickel-Plated, Copper-Clad, Rubber-Coated, Lead-Coated, Chromium-Plated, Zinc-Coated, Plastic-Sucker Rods. Complete Sucker Rod Museum showing the original sucker rod forging machine on which the first all-metal sucker rod was made, and also showing the original hickory or ash rods with wrought iron box and pin joints riveted to the wood.

AIR GAS AMMONIA

compressor operators
do you want peak performance

- Quiet, vibration-free operation
- 20 to 60% more valve area
- Less power consumption
- Low pressure loss
- Normal discharge temperature
- Lower operating costs

if you do . . . *investigate the established advantages of VOSS VALVES for your machines.*

VOSS VALVES are made to specifications, machined from solid stock (not cast)—PLATES are machined and ground (not press formed) for precise high-tolerance fit; VALVES and PLATES are of heat-treated alloy and stainless steel; the PLATES are dimensionally stable, ductile, resist fracture, high temperatures and corrosion; withstand fatigue; won't chip, crack or score cylinder walls.

To increase the efficiency of your compressor, send us the name, bore, stroke and speed of your machine. Our detailed proposal will be sent without obligation.

J. H. H. VOSS VALVES REG. U.S. PAT. OFF.
J. H. H. VOSS CO. INCORPORATED
783-B East 144th Street, New York 54, N. Y.

Accident PREVENTION Pays

Over two million workers in America are injured annually in on-the-job accidents. Of those injured, ninety thousand suffer permanent injuries or impairments and many are totally disabled for life. Add to this the sixteen thousand killed annually in on-the-job accidents and you get an idea of the terrible toll we pay for our carelessness.

MOST ACCIDENTS CAN BE PREVENTED

Safety Engineers tell us and many Safety minded business and industrial firms are proving that most on-the-job accidents can be prevented. Do YOU have a Safety Program? If you do, it's your responsibility to give it your full support. If you do not, it's your responsibility to get one started as quickly as possible.

Largest Writer of WORKMEN'S COMPENSATION INSURANCE *in Texas*

HOMER R. MITCHELL, *Chairman of the Board* A. F. ALLEN, *President*

Service Offices: ABILENE • AMARILLO • AUSTIN • BEAUMONT • CORPUS CHRISTI • DALLAS • EL PASO
FORT WORTH • FREEPORT • GALVESTON • HARLINGEN • HOUSTON • LUBBOCK • LUFKIN • MIDLAND
ODESSA • PORT ARTHUR • SAN ANGELO • SAN ANTONIO • SHERMAN • TYLER • WACO • WICHITA FALLS

TEXAS EMPLOYERS INSURANCE ASSOCIATION
HOME OFFICE - DALLAS, TEXAS

Harbison-Fischer Manufacturing Company

Booth 8, Texas Building

NEW PRODUCTS DISPLAYED:

A New "Double-Displacement" Sub-Surface Rod Pump has just been placed on the market. A working model display will compare the displacement of the new pump with that of a conventional insert pump. Both pumps will be operating side by side and will be producing fluid through transparent tubing strings at the same pumping rate.

Circle No. 342 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

"Texas Stripper" Rod Pump; H-F Three-Tube Rod Pump; and H-F "Flexite" Plunger for Tubing Pumps; Balls and Seats; Stuffing Boxes; Polished Rods; Rod Guides; Oil Savers.

Universal Packing and Gasket Company

Booth 16, California Building

NEW PRODUCTS DISPLAYED:

Utex-Mattco Liner Packings are composed of metal lantern and spreader rings and special molded duck and synthetic composition sealing rings. They are available for all makes and sizes of slush pumps and are said to seal highest known pressures.

Circle No. 343 on Postcard, Page 316

Ezeseal Liner Packing is composed of metal lantern ring and special molded duck and synthetic sealing rings and is available for all makes and sizes of slush pumps, and interchangeable with manufacturers' parts. Tough reinforced sealing rings hold highest pressures with safety.

Circle No. 344 on Postcard, Page 316

No. N777 "Non-Crushable" Fluid Piston Rod Packing has rings molded of an abrasive resisting synthetic and fabric composition, alternated with rings of tough Hycar and is available in sets for all makes and sizes of oil field pumps. This packing is said to hold highest pressures with safety and to increase the life of rod.

Circle No. 345 on Postcard, Page 316

No. 770 Valve Cap and Cylinder Head Gaskets are high pressure molded of special synthetic and fabric composition and available for all makes and sizes of oil field pumps.

Circle No. 346 on Postcard, Page 316

Uron Cups are constructed of various fabric and synthetic compositions and are available in round, bevel or flat heel designs for hot and cold water and oil, mud, hydrocarbons, mild chemicals and acids.

Circle No. 347 on Postcard, Page 316

Armco Steel Corporation

E. of Block R

NEW PRODUCTS DISPLAYED:

A new exhaust stack rain shield constructed of Armco Aluminized steel protects hot exhaust stacks (600 F. to 900 F.) from sudden thermal shock caused by rain storms. Aluminized steel is used because it offers a combination of heat and corrosion resistance.

Circle No. 348 on Postcard, Page 316

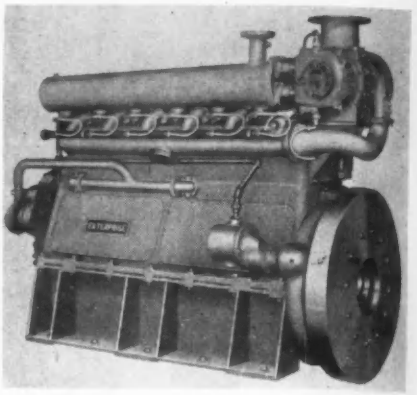
OTHER PRODUCTS DISPLAYED:

Stainless Steel Relief Valves, Polished rod, Bull Plugs, Shot Hole Anchor, Tower Lining, Down-the-hole Pump Parts, Perforated Well Screens, Wellhead Equipment, Pipe Line Orifice Plates, all of stainless steel; mechanical steel tubing used for shot hole casing; and Armco Zincgrip steel tubing used for handrails in refineries and tank farms.

Enterprise Engine & Machinery Company

Block 122

NEW PRODUCTS DISPLAYED:



Enterprise Four-Stroke Cycle Engine, completely portable, skid-mounted, automatic pipe line pumping rig, operated on a dual fuel principle. The Enterprise four-stroke cycle engine develops 400 brake horsepower at 800 revolutions per minute. The unit will drive through Falk gears a six inch two-stage United Centrifugal Pump rotating at 3550 revolutions per minute and delivering 1510 gallons per minute at 375 pounds per square inch. A Young radiator with engine-driven fan will provide jacket water cooling and lube oil cooling for the engine and gear.

Circle No. 349 on Postcard, Page 316

Parsons Company

Block 205, North Area

NEW PRODUCTS DISPLAYED:

The Model 215 Pipeline Trenchliner digs in a range of 30 digging feeds, from 6.2 inches to 18½ feet per minute, 13 to 31 inches wide and to a depth of 6 feet. Crawler treads on the self-cleaning lug type shoes are 18 inches wide and equipped with replaceable links, pins and sealed bearing mounted crawler rollers. All gears are enclosed and running in oil. Shaft openings are dirt sealed and a choice of two standard make 55 hp diesel engines is available. Other features include friction clutch control of digging wheel, self-sharpening Tap-In digging teeth and a shiftable and reversible spoil conveyor.

Circle No. 350 on Postcard, Page 316

The Model 88 Trenchmobile is equipped with pneumatic tires, automotive type steering and hydraulic brakes and can be driven safely through traffic at road speeds up to 12.6 miles per hour. It will dig in widths of 8 or 12 inches with variable digging feeds up to 17 feet per minute maximum. Maximum depth of trench is five feet. Other features include heavy-duty all-welded construction on an arch type frame, a telescopic ladder-type boom, controlled discharge through a reversible and shiftable belt conveyor, hinged crumber that permits making vertical setins, friction clutches for controlling boom hoist, and engine and bucket line speeds.

Circle No. 351 on Postcard, Page 316

Tubular Exchanger Manufacturers Association

Block 105

PRODUCTS DISPLAYED:

Heat Transfer Equipment.

Lighter . . . TOUGHER

COFFING CHALLENGER SPUR-GEAR HOIST

Never before such easy portability and rugged, shock-resisting strength in a spur-gear hoist . . . never such simplicity of design and ease of servicing.

Light weight— carry it in one hand; set it up anywhere. One-ton model weighs only 39½ lbs.

All Steel—even the housing. Takes shock loads and impact as only steel can.

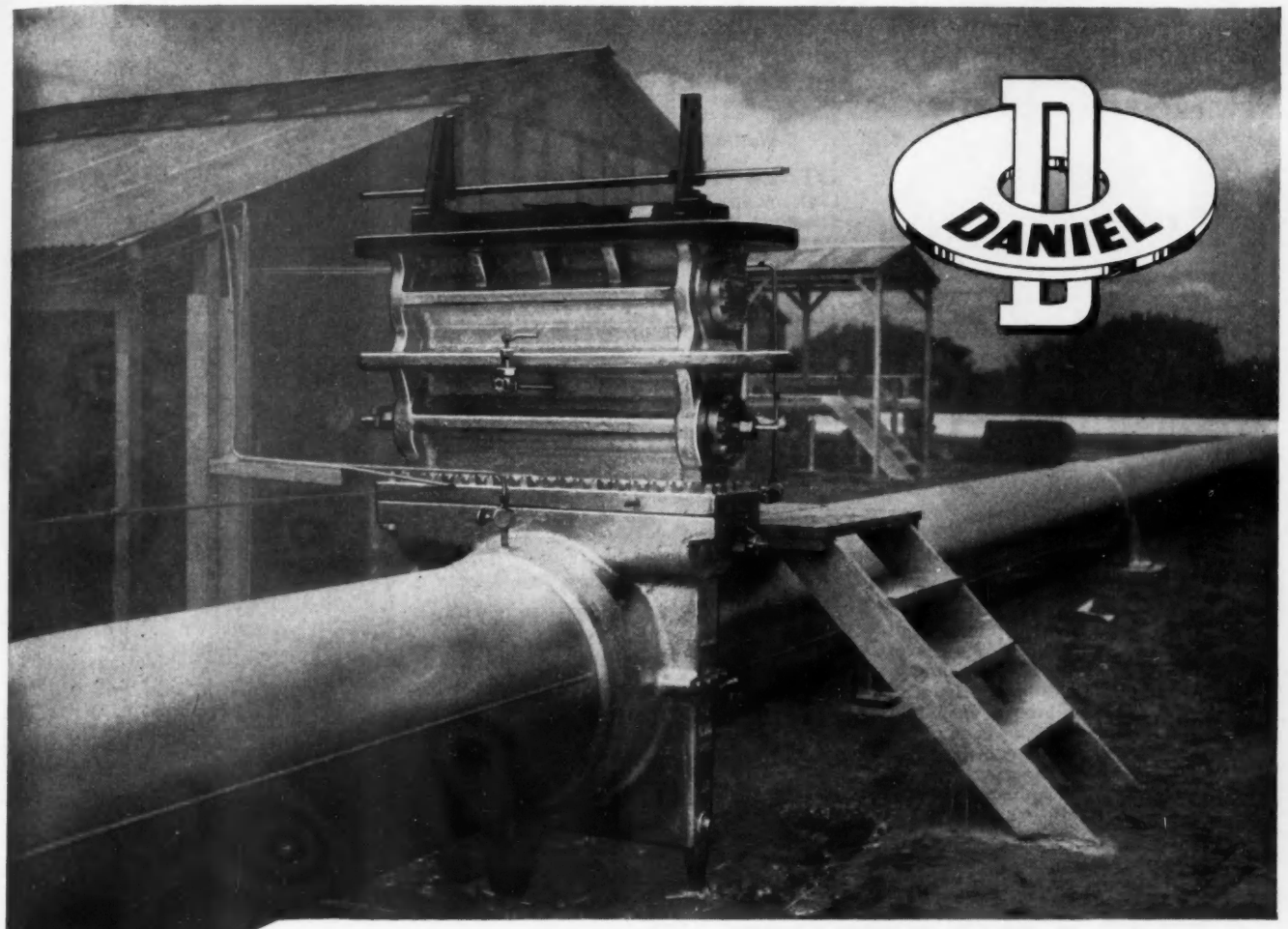
Easy to Service—may be completely disassembled in minutes with ordinary tools. Simplest spur-gear hoist ever built.

Find out how this better spur-gear hoist can improve operations and save expense for you. Write for bulletin 05C

COFFING HOIST COMPANY
DANVILLE, ILLINOIS

Quik-Lift Electric Hoists • Hoist-Alls Safety-Pull Ratchet Lever Hoists • Mighty-Midget Pullers Differential Chain Hoists Load Binders • I-Beam Trolleys

Sold By Distributors Everywhere.



"BACKING UP" the Readings with 25 YEARS EXPERIENCE

For a quarter of a century, the name DANIEL has been synonymous with dependability and accurate orifice meter measurement in all classes of service. Illustrated above, a Daniel 30″ senior orifice fitting and meter run—one of the Daniel Products used during the Refugio Orifice Meter Tests, sponsored by the AGA, the ASME and U. S. Bureau of Standards. Service and engineering consultations, too, are readily available with factory branches, sales offices, and warehouses strategically located in the very heart of the main oil and gas producing areas—Sales Agencies in all principal cities of North and South America.

For a full detailed description of Daniel Orifice Fittings, Simplex Plate Holders, Check Valves and other products for the oil & gas industry refer to the Composite Catalog, or write direct.

See the 30" Daniel Fitting in our booth #39 Scientific & Technical Bldg. at the Tulsa Oil Show

DANIEL ORIFICE FITTING COMPANY
INCORPORATED

3352 Union Pacific Ave., Los Angeles 23, Calif. • 5405 Clinton Drive, Houston 20, Texas

Sales Offices in **Dallas • Tulsa • Odessa**

Christensen Diamond Products Company

Booths 1 and 2, Silver Lane

NEW PRODUCTS DISPLAYED:

Type EIC Diamond Drilling Bits are designed for faster penetration and improved samples. The diamonds are set in steps producing large cuts which are rapidly flushed through the annular grooves into return mud streams. This arrangement accounts for the larger cuttings. Regrinding of cuttings is eliminated and faster penetration is possible.

Circle No. 352 on Postcard, Page 316

Diamond Reamers, like the diamond set reamer illustrated, is currently undergoing test in West Texas. This tool is designed primarily to reduce reamer costs in penetrating hard, abrasive formations with steel bits.

Circle No. 353 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Diamond Core Bits; Face Discharge Diamond Core Bits; Diamond Drilling Bits; Diamond Washover Shoes; Diamond Core Barrel.

Henry Vogt Machine Company

Booths 13 and 14, Oklahoma Building

NEW PRODUCTS DISPLAYED:

The New Union Bonnet, Bolted Gland Gate Valves have a gasket joint and are of outside screw and yoke design, have renewable seat rings, a solid wedge of slotted type, and a rising stem. Trimmings are 11½ to 13% chrome with hard faced seat rings. These valves are designed for 150 to 800 pounds service in sizes from ¼ to 2 inches.

Circle No. 354 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Drop Forged Steel Valves; Fittings; Flanges; Heat Exchanger Unit.

Wichtex Machinery Company, Inc.

Block 119, West Area

PRODUCTS DISPLAYED:

Wichtex Well Servicing Units—Models E-75 and TE-2.

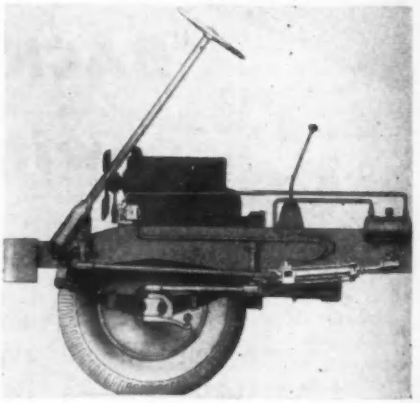
Vickers Inc.

Block 104

NEW PRODUCTS DISPLAYED:

The Hydraulic Pumping Unit has many high-production and low-maintenance features. These units are available in 30- and 20-foot pumping stroke models.

Circle No. 355 on Postcard, Page 316



The New Vickers Hydraulic Steering System is used on oil field trucks and mobile drilling and servicing rigs.

Circle No. 356 on Postcard, Page 316

Philadelphia Gear Works, Inc.

SE Corner of Cafeteria

NEW PRODUCTS:

SMA-1 Limitorque Automatic Valve Operator.

Circle No. 357 on Postcard, Page 316

Otis Pressure Control Company

Booth 113, Texas Building

PRODUCTS DISPLAYED:

Bottom-Hole Chokes; Safety Valves; Removable Sub-Surface Controls; Special Nipple Assemblies for Dually-Completed Wells; Chemical Injector Tools; Otis Surface Safety Valves.

JUSTRITE

Justrite Safety Products, safety-designed and engineered to meet every requirement, are available from leading industrial supply houses throughout the country.

JUSTRITE SAFETY CANS

APPROVED, Inspected and individually numbered and labeled by Underwriters' Laboratories, Inc.

APPROVED by the Associated Factories Mutual Fire Insurance Companies, and so stamped.

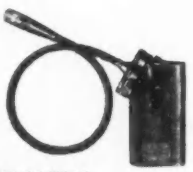
APPROVED by New York City Fire Dept., Approval No. 92.

For pouring flammable liquids with minimum fire risk. Exclusive "Swinging" Handle for LESS handling fatigue. Spill-Proof pouring lip. Rounded dome prevents collection of dirt, liquid. Spring cap releases excessive pressure, closes automatically. Lead-coated 24 gauge steel, double seamed and soldered. Available in 7 convenient sizes from Pint to 5 Gallon.

JUSTRITE SAFETY EXTENSION LIGHT

APPROVED by Underwriters' Laboratories, Inc. For use in Class 1, Group D, Explosive Atmospheres.

First approved safety light for inspecting barrels, pipes, machinery. Uses 3 standard flashlight batteries. Flexible bronze extension holds any curvature. Unbreakable bulb cap, Justrite kick-out bulb feature. Quickly converts to standard flashlight—Exclusive with Justrite. 15" and 30" extension lengths. Model No. 1727-S.



GUARD AGAINST DANGER

WITH JUSTRITE SAFETY APPROVED PRODUCTS.

JUSTRITE

2061 N. Southport, Chicago 14, Ill.

Here in Time for the "Tulsa Oil Show"

It's New

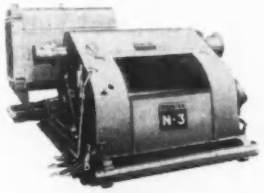
The New Brewster "Little Big Rig" designed for 6,000′ drilling programs.

BREWSTER'S **N45** DRAWWORKS

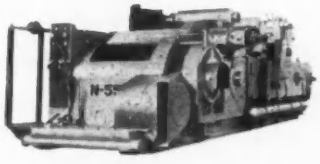
See the Oil Industry's newest rig unveiled on opening day, May 14.

TULSA OIL SHOW **BREWSTER EXHIBIT** ON SILVER LAN

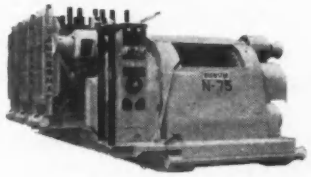
4 of Brewster's great line of drawworks will be "rigged up" and in full operation for your inspection.



N-3 Drawworks



N-55 Drawworks



N-75 Drawworks

and Brewster's newest rig, the *N-45 Drawworks*

THE BREWSTER COMPANY, INC. SHREVEPORT LOUISIANA

BREWSTER DRILLING EQUIPMENT

Jet-Lube, Inc.

Booth 200, Oklahoma Building

NEW PRODUCTS DISPLAYED:

The Jet-Lube Applicator provides a new method of applying lubricant to tool joints, drill collars, drill tubing and casing. The applicator has been designed to avoid contamination and to eliminate waste with complete coverage of the threads and maximum speed and ease of application. The equipment consists of a flexible head, swivel-mounted to a handle, and a trigger-operated control valve connected to a high pressure hose carrying lubricant under pressure from an enclosed container and pump. The head is inserted into the box of the joint, and the grease, in an enclosed system, is forced into the threads from bottom to top, forcing out drilling fluids and contamination. Brushing is eliminated and the container is off the rig floor.

Circle No. 358 on Postcard, Page 316

Jet-Lube 550 is a new metallic base, low-friction thread lubricant containing moly-disulphide. It is designed for drill collars and heavy duty on drill pipe where full make-up and easy, non-galling "break out" properties are essential. Metallics are super-ground to one micron and under. Jet-Lube 550 is a high temperature lubricant but pumpable at sub-zero; non-soluble in water or drilling fluids; will not settle out or "bleed"; will not work harden nor pack.

Circle No. 359 on Postcard, Page 316

Jet-Lube 21 is a new inexpensive metallic base tool joint and pipe lubricant compounded for medium service where high torque temperature and weight are not factors. Made with a silica type base containing moly-disulphide micro-ground to one micron and under, it has no melting point, is non-galling, non-seizing, highly fluid, and will not pack or work harden. Jet-Lube 21 also is water resistant and pumpable at low temperatures. It is used where non-fluorescence is not a factor and contains rust inhibitor but not lead or zinc.

Circle No. 360 on Postcard, Page 316

Kopr-Kote is a copper-lead-graphite metallic base lubricant compounded particularly for use on casing and tubing. It provides a tighter seal under high temperatures and pressures. Its low coefficient of friction makes for low make-up and breakout torque. The unique metallic base prevents destruction of seal under vibration and shock; reduces leakers to the vanishing point. Kopr-Kote is used on drill collars and for high temperature and pressure steam and oil lines; for boiler gaskets, cylinder head studs, intake and exhaust manifold studs; drive chains, eccentric pivots and guide ways.

Circle No. 361 on Postcard, Page 316

Jet-Lube VL-5 Valve Lubricant is an all-purpose "no-drop" valve lubricant with non-melting, high temperature and low friction characteristics. It contains moly-disulfide micro-ground to one micron and under in a silica base. The lubricant is insoluble in hydrocarbon solvents, gas and oil, water, brine, most acids and most alkaline solutions. Jet-Lube VL-5 is made in fast and slow types and contains rust preventative.

Circle No. 362 on Postcard, Page 316

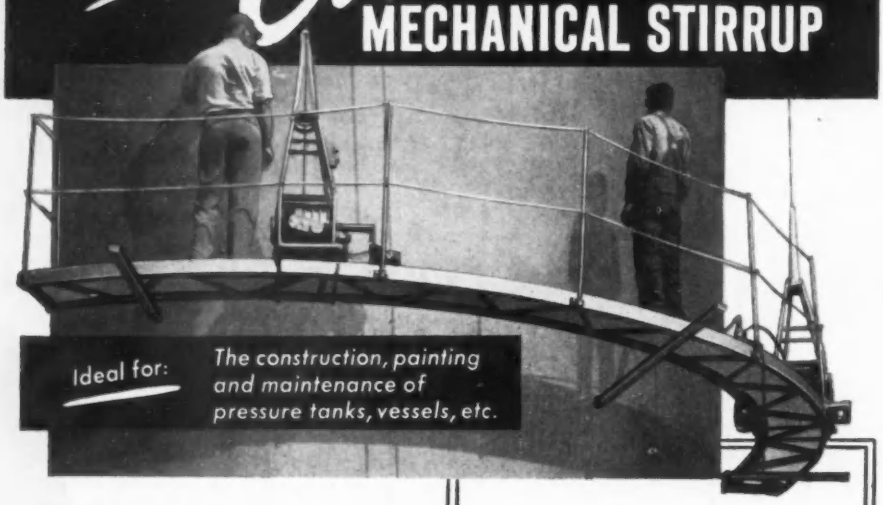
Jet-Lube VL-1 Valve Lubricant is a clear lubricant having heat-resisting and anti-solvent features of VL-5. This lubricant is available in sticks or bulk and is made in fast and slow types.

Circle No. 363 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Jet-Lube Blacklite No. 1; Jet-Lube All Purpose Lubricant and Applicator; Jet-Lube Gear Lubricant.

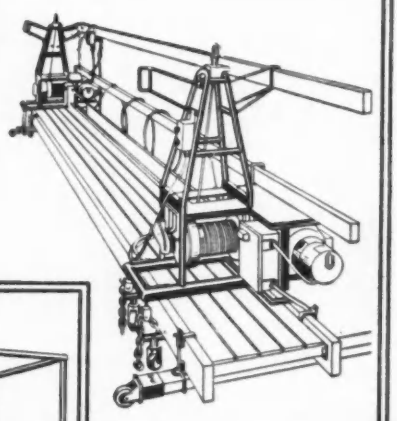
The New ALBINA Circular! MECHANICAL STIRRUP



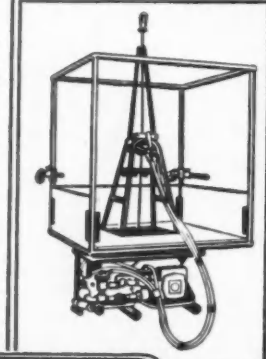
Ideal for: The construction, painting and maintenance of pressure tanks, vessels, etc.

ALUMINUM DIAMOND PLATE DECK PLATFORM

Platform as shown may be used as a 6, 16, 22 or 28-ft. swing stage. Platform consists of two 6-ft. and one 16-ft. sections. Can be used as a swing stage, single stirrup or basket. Air or electric operated.



ALBINA MECHANICAL STIRRUPS are gaining in popularity by contractors across the nation. Workers like their safety features and convenience of rigging.



On Display INTERNATIONAL PETROLEUM EXPOSITION Tulsa, Okla. May 14-23

Write for Complete Illustrated Catalog

ALBINA ENGINE & MACHINE WKS.
2100 N. Albina Ave. Portland, Oregon

National Tube Division – United States Steel Corporation

Block 2

NEW PRODUCTS DISPLAYED:

A Special Seamless Casing for deep well drilling is substantially stronger and lighter than the highest grade covered by API specifications. It has broadened drilling depths by several thousand feet.

Circle No. 364 on Postcard, Page 316

A New Type Buttress Thread Casing answers the need for a casing joint capable of supporting the weight of casings for deep wells with a maximum of safety and economy. The high tensile strength joint is practically as strong as the body of the pipe.

Circle No. 365 on Postcard, Page 316

Carboloy, Dept. of General Electric Co.

Booth 39N, North Area

PRODUCTS DISPLAYED:

Created Metals Used in the Oil Industry: Tungsten Carbide, Chrome Carbide, Hevimet, and Carboloy Permanent Magnets.

RIGHT ON TOP...

with the Correct Answers

when you run a SPERRY-SUN E-C Inclinometer...

✓ The Sperry-Sun E-C gives a *correct* answer because it will not record at all until the instrument comes to rest.

✓ E-C readings are accurate and you can check how accurate by raising the instrument a few feet and lowering it to the recording depth for a "double check" reading.

✓ E-C provides multiple readings when required, measuring inclination at several depths in the hole. It is the only straight hole instrument which offers this advantage.

• E-C rental rates are reasonable — you do not pay a premium rate for premium performance. Rent an E-C and keep it on the rig until the last foot of hole is made. It will give you more information with less cost, less work and less trouble than any other straight hole instrument. Contact the Sperry-Sun office nearest your location.

SEE OUR EXHIBIT

at the International Petroleum Exposition Booth 82, Scientific & Technical Building, Tulsa, May 14-23

SPERRY-SUN WELL SURVEYING COMPANY

3118 BLODGETT AVENUE • HOUSTON, TEXAS

A MILE OF OIL!

This compact little pump delivers a barrel of oil per minute at 150 pounds pressure—enough pressure to pump water or oil through more than a mile of 2" pipe.

Model 6600

- Erosion resistant synthethic rotors for dirty liquids.
- Corrosion resistant bronze construction.
- Lightweight • Portable • Self Priming.
- Available for Gas Engine, Electric or Belt Drive.

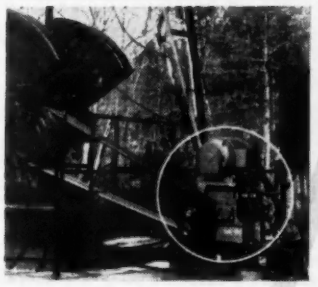
Proven Superiority in

BRAKE COOLING
WASH-DOWN
TRANSFER
FIRE FIGHTING
WASTE DISPOSAL

And numerous other specialized oil field pumping jobs.

AVAILABLE AT LEADING OIL FIELD STORES

MARINE PRODUCTS COMPANY
515 LYCASTE AVE. DETROIT 14, MICHIGAN



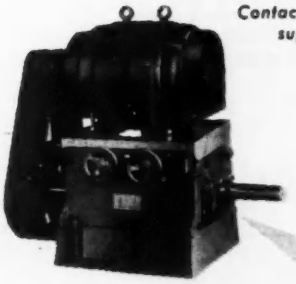
Typical oil field installation on single reduction pumping unit pumping 10, 13, 16 and 19 SPM.

New!

VARY SPMs at the TWIST of a WRIST!

4-SPEED TRANSMISSION
1 THRU 60 H. P.
FOR ALL TYPES and SPEEDS of ELECTRIC MOTORS and GAS ENGINES

Consider these applications and problems! Single Reduction Pumping Units—Pump as slow as conditions require—Double Reduction Units too—Tri-Plex and Centrifugal Pumps for Water Flood—Offers 4-Speed Flexibility—Pipe Line Gathering Pumps—Correcting Cold Weather Difficulties—Repressuring Plants—Geared Powers—Refineries—Drilling Rig Accessories—All Turner Transmissions are especially designed and guaranteed for continuous Oil Field Duty.



Contact your local oil equipment supply store or write:

TURNER UNI-DRIVE Company
3418 Terrace Street Kansas City 8, Missouri

Murphy Diesel Company

On Ramp W of Block Q

PRODUCTS DISPLAYED:

Murphy Diesel Power Units 90 HP to 246 HP, Dual-Fuel Engines and Generator Set 60 kw to 154 kw, Ratings are for units complete with all power consuming accessories. Engine ratings are on 1200 and 1400 rpm engines.

Plomb Tool Company

Booth 115, Oklahoma Building

NEW PRODUCTS DISPLAYED:

The New Proto Torque Wrench is a torque-limiting device which releases automatically at proper setting and employs a fully enclosed precision spring under compression as the principal torque-controlling element. Desired torque is set by turning the handle, just like a micrometer. Models with a built-in reversible ratchet head are available that do the work of both a ratchet and torque wrench.

Circle No. 366 on Postcard, Page 316

American Roller Bearing Company

Booths 20 and 21, Silver Lane

PRODUCTS DISPLAYED:

Roller Thrust Bearings; Straight Roller Bearings; Single and Double Row Non-Skew Needle Bearings; Radial Bronze Cage Bearings; Stamped Steel Cage Bearings.

HOW TO CHOOSE THE RIGHT ANTI-CORROSION LINING

TUBE-KOTE T.M. Reg.

TUBE-KOTE Lining	RESISTS CORROSION	RESISTS ABRASION	RESISTS PARAFFIN ADHERENCE	VALUE FOR USE IN USED PIPE	RESISTS STICKING	RESISTS SCALING
TK-43	very good	very good		very good		
TK-2 CORROSION (Std.)	very good		very good			
TK-2 PARAFFIN (Special)	Not recommended		very good			
TK-88 TEFLON	Not recommended		Not recommended		very good	very good

Answers

TO YOUR CORROSION PROBLEMS!

TK-43: a thick baked-on, rubber-like lining of polyvinyl chloride, centrifugally cast in one coat. **TK-2 CORROSION (Std.):** a 10-coat application of baked-on phenol formaldehyde plastic. **TK-2 PARAFFIN (Special):** a 5-coat application of specially compounded baked-on phenol formaldehyde plastic. **TK-88 TEFLON:** a high-temperature anti-sticking coating material known as polytetrafluorethylene.

TUBE-KOTE

First Name In Corrosion Resistance

Just off the press: New complete data bulletin on TK-43. Write for your copy.

Tube-Kote, Inc.
P. O. Box 20037, Houston 25, Texas

Please send me full details on your products.

Name_____

Firm_____

Street_____

City_____ State_____

SEND THIS COUPON NOW FOR FULL DETAILS!

The Cooper-Bessemer Corporation

Block G

NEW PRODUCTS DISPLAYED:

The New Cooper-Bessemer GMVA, one of the most recent advancements in gas engine driven compressors, produces 30 percent more power than its running mate, the GMV unit, yet operates at 10 percent greater fuel economy and with less heat load.

Circle No. 367 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Diesel Engines; Gas-Diesel Engines; Gas Engines; Compressors.

Century Electric Company

Block 1 (Jones & Laughlin Supply Co. Booth)

PRODUCTS DISPLAYED:

Splash Proof Motor; Complete Line of Motors and Generators.

The J. P. Ratigan Co., Inc.

Booth 212, Oklahoma Building

PRODUCTS DISPLAYED:

Polished Rod Grip; Blowout Preventer; Stuffing Box; Complete Line of Oil Well Pumping Equipment.

Pacific Pumps, Inc.

Block 11

PRODUCTS DISPLAYED:

Oil Well Plunger Pumps; Single and Multi-Stage Centrifugal Pumps; and a Commercial Size Steam Turbopump.

Viking Pump Company

Booth 57, California Building

PRODUCTS DISPLAYED:

Rotary Pumps.

Unit Rig and Equipment Company

Northeast Corner of Grounds

NEW PRODUCTS DISPLAYED:

UNIT RIG Model U-40 is a new rotary drawworks for drilling from 5500 to 8500 feet.

Circle No. 368 on Postcard, Page 316

UNIT RIG Model U-34T is a trailer-mounted work-over and drilling rig.

Circle No. 369 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

UNIT RIG Drawworks Models U-20, U-30, U-34, U-35 and UNIT RIG Engine Compounds.

Taylor Instrument Companies

Booths 31, 32 and 87, Scientific and Technical Building

NEW PRODUCTS DISPLAYED:

Transaire Differential Pressure Transmitter.

Circle No. 370 on Postcard, Page 316

Transet Recorder Receiver.

Circle No. 371 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Flow Meters; Mercury Manometers; Industrial and Etched Stem Thermometers; and Fulscope Controllers.

24 ACRES *Cover the World*

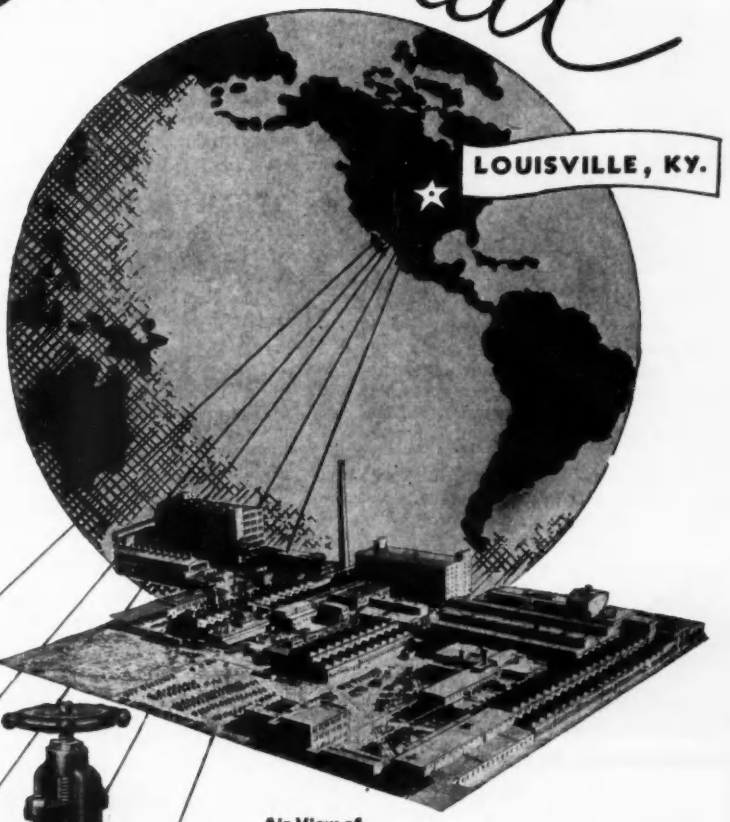
. . . with TOP QUALITY

DROP FORGED STEEL

VALVES, FITTINGS and FLANGES

by

Vogt



Air View of
Henry Vogt Machine Co.

This 24 acre Vogt plant supplies the most comprehensive line of top quality *drop forged* steel piping materials anywhere available to industry. That's why they're the choice of leading refineries, power plants, chemical plants, etc., the world around!

OUR COMPLETE LINE INCLUDES

Flanged, Screwed and Socket Weld End Globe, Gate and Check Valves • Ells, Tees and Crosses • Couplings • Bushings • Plugs • Unions • Flanges and Flange Unions • Welding Heads

HENRY VOGT MACHINE CO. LOUISVILLE 10, KY.

Branch Offices: New York, Philadelphia, Chicago, Cleveland, St. Louis, Dallas, Charleston, W. Va.

BEMCO Hammer-up Lock Nuts end the tedious and time-consuming job of tightening hex nuts on slush pump pony rods and piston rods. Made of special alloy cast steel, the nuts are accurately threaded and faced to assure speed and *positive locking* when they are hammered up.

Replace your hexagon rod nuts with BEMCO Hammer-up Lock Nuts and save time . . . trouble . . . and worry.

L&H MACHINE WORKS
2205 Quitman Houston, Texas
EXPORT: Baird Supply Co., Inc.
420 Lexington Ave., New York, N. Y.

"DON'T FENCE US IN!"

The cow, by nature, won't jump the fence . . . The only place we put production fences for ring problems is behind us.

Shirt sleeved engineering in your packing or piston ring problems is something we relish; so "don't fence us in" . . . let us prove to you we can lick your special problems.

Write for Complete Information

- Metallic Packings
- Power Piston Rings
- Carbon-Bakelite Liquid Pump & Compressor Piston Rings
- Valve Discs

FRANCE PACKING COMPANY
6514 STATE RD., PHILADELPHIA 35, PA.

The Harnischfeger Corporation

Block 203

NEW PRODUCTS DISPLAYED:

The P&H DC Rectifier Welder is a new unit that offers all the advantages of DC welding without the expense of a motor-generator. Its design is unique for a DC welder inasmuch as it has no moving parts to wear, and only a single knob for heat control.

Circle No. 372 on Postcard, Page 316

A New P&H Diesel Double Power Unit is made up of two 6-cylinder 687 diesels on a single drive shaft.

Circle No. 373 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Small Excavators; Truck Cranes; Welding Equipment; Diesel Engines; Electric Hoists; 75 KW Electric Generating Set; P&H Zip-Lift and Hevi-Lift Electric Hoists; Full Line of Pre-Fabricated Homes.

Reliance Electric and Engineering Company

Block 206

NEW PRODUCTS DISPLAYED:

The New Reliance V*S Drive is a packaged, all-electric adjustable-speed drive which provides a wide range of standard equipment-operating control functions, including quick, smooth starting and stopping and smooth acceleration and deceleration.

Circle No. 374 on Postcard, Page 316

Reliance V*S Jr. is the adjustable-speed drive developed for application to small machinery.

Circle No. 375 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Cutaway Display of A-C Motor; Lubrication Demonstration of Reliance Motors; Electronic Control Accessories; Individual Motor and Control Parts; Varied Motor and Drive System Arrangements.

Dailey Oil Tools

South part of Block 104

PRODUCTS DISPLAYED:

Hydaulic Pulling Tool; Mobile High-Pressure Pumping Units; Complete Line of Cutting and Fishing Tools.

Henderson Welding Works, Inc.

Blocks N, R, and 202

NEW PRODUCTS DISPLAYED:

A New Jackknife Rig which can be packaged in four loads, can be rigged in 3½ hours. It has capacity of 6500 feet of 3½-inch or 14,000 feet of 2⅜-inch tubing. A complete operating unit except drill pipe can be compacted in four highway regulation loads: drawworks; substructure and mast; mud pump, water pump and light plant; and kelly, stairs, hand rails, timbers, oil drums, and blowout preventer.

Circle No. 376 on Postcard, Page 316

Kennametal Inc.

Booth 89N, North Area

NEW PRODUCTS DISPLAYED:

Kennametal's new valve ball is one-third lighter than steel and has almost the equivalent in wear-resistance of regular sintered carbides. The ball is made of titanium carbide and has high corrosive resistance. The ball has a Rockwell A hardness of 88, and a specific gravity of 6.15 as compared to 8.5 for steel or usual tungsten carbides of 12. Wear-resistance in producing heavy sand-cut fluids has been demonstrated as almost equal to that of Kennametal's regular tungsten carbide and lowest cage damage results due to gas pounding, ball flutter, ball spin, and other causes of cage damage that are caused by ball pounding and cage rub.

Circle No. 377 on Postcard, Page 316

OTHER PRODUCTS DISPLAYED:

Complete Line of Tungsten Carbide Balls and Tungsten Carbide Seats; Inserts for Drag and Cone Type Bits; Metal-Cutting Tools.

PRINTED FORMS FROM STOCK

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Immediate delivery of producing and pipe line forms made from our complete line . . . Write for completely illustrated catalog.

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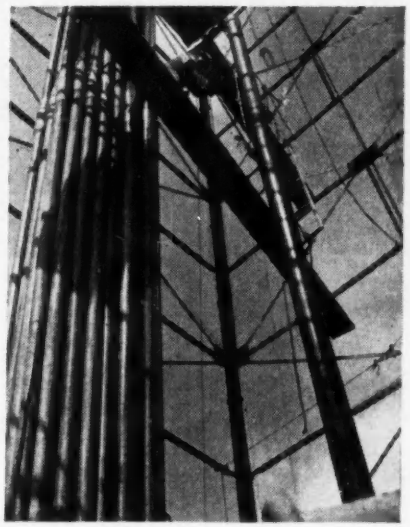

Make a note: Electric Weld Casing and Tubing in sizes 2⅜" to 13⅜", grades H-40 and J-55. Seamless Casing and Tubing in sizes 2⅜" to 9⅝", through grade N-80.

. . . . . NOW SPECIFY

REPUBLIC

During the past 23 years, millions of feet of Republic Electric Weld Casing and Tubing have been run into shallow wells and deep wells in every field.

Records of performance have established indisputable proof of the ease of running and dependability in service of these products—which today are universally accepted throughout the oil and gas industries.

Now, two new products are added to the Republic Line of Oil Country Tubular Goods—Republic Seamless Casing and Tubing.

A brand-new modern seamless tube mill in Chicago will greatly expand Republic's integrated pipe-making facilities—will provide more casing and tubing for you.

Electric Weld Casing and Tubing are made in sizes 2⅜" to 13⅜", grades H-40 and J-55. Seamless Casing and Tubing will range from 2⅜" to 9⅝", through grade N-80.

Call your nearest Republic District Sales Office—or write us for further information.

REPUBLIC STEEL CORPORATION
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Export Department: Chrysler Building, New York 17, N. Y.

Republic

REPUBLIC STEEL

CASING AND TUBING
Electric Weld and Seamless

Aerial view of Schlumberger Well Servicing Corporation's new $6 million Houston plant and headquarters.

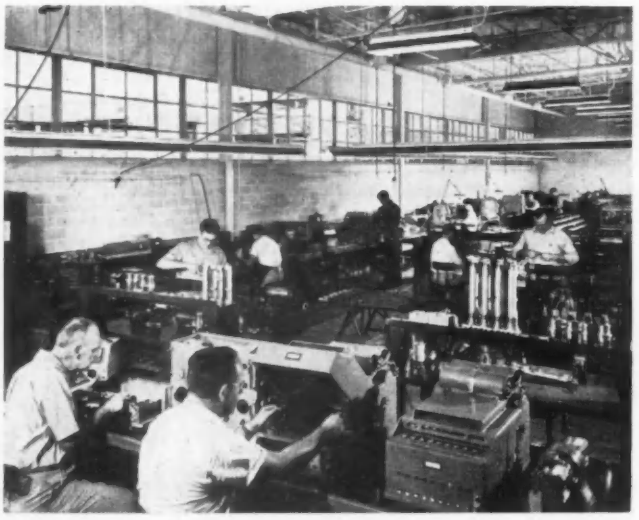
Schlumberger Moves Into $6 Million Houston Plant

It took two years to build seven buildings with 240,000 square feet of floor space.

On May 4th Schlumberger Well Surveying Corporation will open its new $6 million Houston plant and headquarters building which have been under construction for more than two years. The new facilities include seven separate buildings which comprise over 240,000 square feet of floor space. Made of steel and masonry, the modern structures are located on a 36.4-acre tract served by a railroad spur. This will serve as the nerve center for the world-wide well servicing organization. The new administration building consists of 162 rooms, offices, conference rooms and a library. It is 300 feet long with three 84-foot two-story wings. The center wing is three stories high.

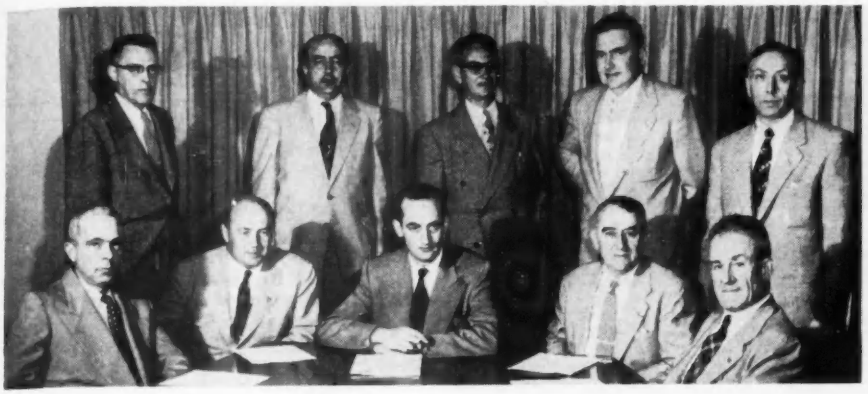
The engineering building houses the electrical and mechanical engineering staffs and is equipped with the latest equipment for testing and designing well servicing devices. Each laboratory contains special power supply panels which have cable connections to water bath located adjacent to the structure. It is possible for Schlumberger engineers to test logging tools in water of known conductivity without leaving the laboratory. Incorporated into the engineering building is a two-story high room completely encased in concrete for testing and calibrating radioactive logging instruments. There are 12 electrical engineering laboratories, an engineering library and a large drafting room.

Adjacent to the engineering building is the engineering testing and power building. At one end of this structure are two test wells or "pressure" tubes in which well conditions can be simulated for the deepest wells. Pressure in each well can be raised up to 25,000 pounds per square inch and up to 400° F. This building also



Skilled craftsmen turn out highly-specialized electronic equipment in air-conditioned electrical production shops.

The new machine shop is located in the same building with the electrical production shops and is air-conditioned.



Executives of the Schlumberger Well Servicing Corporation are, seated, left to right: D. C. McCann, vice president, Operations and Services; W. J. Gillingham, executive vice president; P. Schlumberger, president; E. G. Leonardon, director in charge of special assignments, and A. Blanchard, vice president, Engineering. Standing, left to right, are: A. Vennema, vice president, Personnel; A. J. Peissel, assistant to the president, W. M. Padgett, Controller; R. R. Rieke, sales manager, and W. B. Steward, assistant to the president.

houses the heating and air conditioning equipment for the new plant. It also contains a cafeteria, fully equipped with modern facilities for employes and guests.

Electrical and production shops are housed in one giant structure which has 31,300 square feet of floor space. The many well logging tools used by Schlumberger are fabricated there. In the electrical shops are assembled the sensitive electronic circuits and special equipment used in the logging trucks. The machine shop, which works hand-in-hand with the electrical shop, is equipped with metal working tools used in the fabrication of perforating guns, hoists, frames and a host of special equipment for logging and perforating services. Both shops are completely air conditioned.

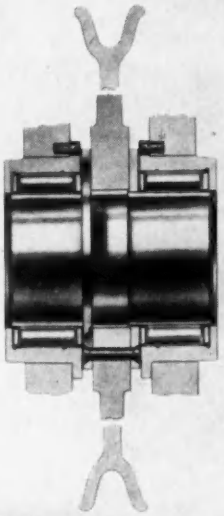
Second largest building in floor space is the truck shop where the logging trucks are readied for field service. Total floor area is 45,000 square feet. Capable of turning out 12 new surveying units monthly, the truck shop houses about 50 pieces of major equipment. These include a 10-ton traveling crane, a three-ton crane, a 4000-pound capacity fork lift, several jib cranes, a nibbling machine, huge metal shears, a press break, welding equipment and new sand blasting and painting equipment.

The largest building in floor space is the warehouse. It occupies 49,000 square feet and serves as a huge storehouse for materials and equipment needed in the manufacture of highly-specialized well servicing units. Finished equipment ready for shipment to any of Schlumberger's 90 U. S. and Canadian branch offices also is stored in the warehouse. Housed here is also a modern wood-working shop which makes among other things, the varied types of crates needed to ship equipment everywhere.

The winch house, smallest of the seven buildings, covers 924 square feet and houses cable reels which enable quick spooling of special electrical cable onto the reels of each truck unit.

End of the well service truck equipment assembly line in truck shop. Here final touches are put on each unit. Twelve complete units are produced each month.

STANDARD
OF THE
PETROLEUM INDUSTRY
Since 1905



Regan *time proven*

DUAL BEARINGS

. . . for greater bearing life and longer wire line life. With Regan exclusive, rotating inner race Dual Bearings, each sheave has an integral rotating pin which distributes bearing wear around the entire area of the pin. Bearings on *each side* of the rotating pin prevent oscillation of the sheave. This construction permits use of smaller bearings which enables the block to operate at greater speed with less friction and minimum wire line slippage. Exclusive Regan long-lived Dual Bearings are embodied in all Regan Crown and Traveling Blocks.

Write for detailed information.

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Exclusive Mid-Continent and Export Distributor:
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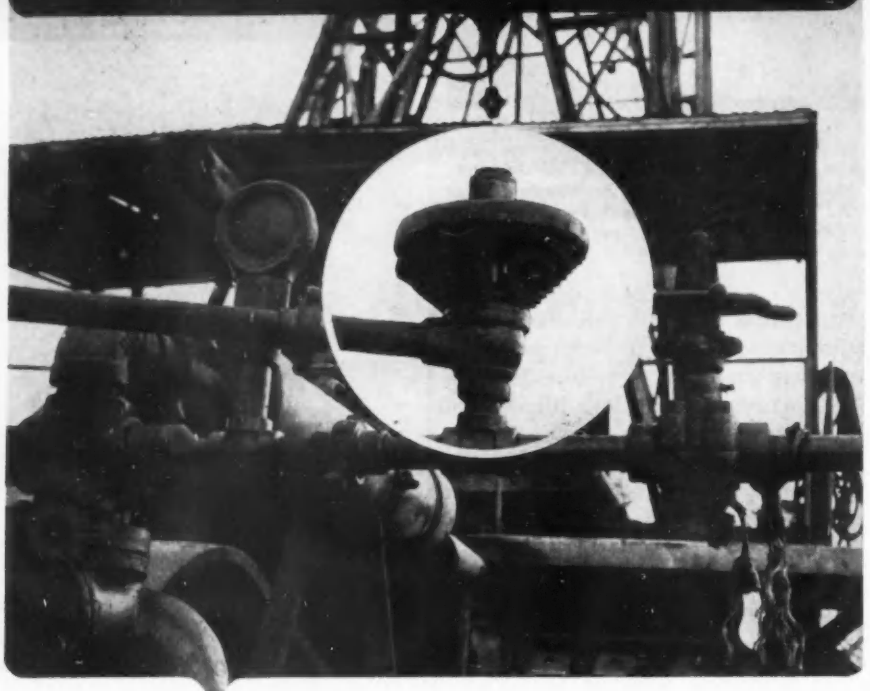
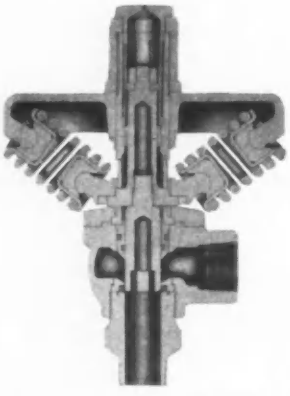
Quality – Wrought on the Forge of Experience

FULLY AUTOMATIC PRESSURE RELIEF for mud operations





Kinzbach Model 112 Relief Valve shown in closed position.

The Kinzbach Model 112 Relief Valve provides safer, more efficient pump or pressure relief and greater flexibility in operations than any other valve. It *snaps open* for instant pressure relief at maximum volume and *snaps shut* to restore circulation instantly and automatically after a predetermined pressure drop. The basic design positively prevents chatter.

The Model 112 Valve can be used for any mud pump relief application, including compounding. Available in 2" and 3" sizes.

Write for full technical data. Ask for bulletin 11250.

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KINZBACH TOOL CO INC

Letters

Chester M. Crebbs of Fort Worth has passed along the following letter to the publisher with the remark "you might enjoy reading this." It's a dispatch from Madrid dated Feb. 6, 1878 from J. R. Lowell, then American minister to Spain, to William M. Evarts, then secretary of state. We enjoyed it, and thought you might. Here it is.—The Editor.

The Hon. William M. Evarts,
Secretary of State.

Sir:

One of the devices of Fourcarde which came within M. Silvela's own knowledge when in another department of the Government, is so ingenuous and amusing as to be worth recounting. The Frenchman's object was to smuggle petroleum into Madrid without paying the "octroi." To this end he established his storehouses in the suburbs, and then hired all the lean and least mammalian women that could be found, he made good all their physical defects with tin cans. filled with petroleum, thus giving them what Dr. Johnson would have called the pectorial proportions of Juno. Doubtless he blasphemed the unwise parsimony of Nature in denying to women in general the multitudinous breasts displayed by certain Hindu idols. For some time these seeming milky mothers passed without question into the unsuspecting city and supplied thousands of households with that cheap enlightenment which cynics say is worse than none. Meanwhile M. Fourcarde's pockets swelled in exact proportion to the quaker breastworks of the improvised wet-nurses.

Could he have only been moderate? Could he only have bethought him in time of the *ne quid nimies?* But one fatal day he sent in a damsel whose contours aroused in one of the guardians at the gates the same emotions as those of Maritornes in the bosom of the carrier. With the playful gallantry of a superior he tapped the object of his admiration and—it tinkled. He had "struck oil" unawares. Love shook his wings and fled. Duty entered frowning; and M. Fourcarde's perambulating wells suddenly went dry.

With a gentleman so ingenious the Spanish government is perhaps justified in being on its guard. Even charity has eyes and ears.

PUMPS

for FLUID POWER

in vehicles and equipment required for modern exploration, drilling, production, piping and refining of petroleum. Here is a most comprehensive range of sizes, types, capacities and pressures from 0 to 1500, 2000 and 3000 psi together with hydraulic motors, valves and cylinders for developing complete hydraulic circuits. Here is power which combines safety, flexibility, limitless variations and sound economy . . . hydraulic power at its best.

for HANDLING LIQUIDS

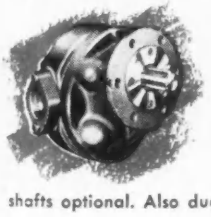
Virtually "any substance that will flow through a pipe" can be efficiently and economically handled in small or bulk quantities by Pumps available from this single source. There are deep and shallow well Centrifugal and Turbine Types, Rotating Plunger and Herringbone Pumps embracing a very broad range of types, sizes and constructions.

for VACUUM PROCESSING

High vacuum pumps for laboratory or high production service in research, vacuum distillation, refrigeration, dehydration, chemical processing, de-aerating, etc.

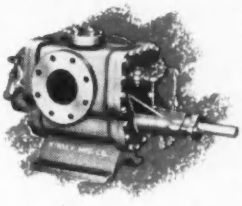
HYDRECO GEAR TYPE PUMPS

Reversible and non-reversible. Gear type pumps in exclusive FOUR-BOLT design . . . capacities from .5 to 130 gpm and operating pressures to 1500 psi . . . flange or foot mounted . . . furnished with keyed shaft with spline shafts optional. Also dual and tandem models.



KINNEY LIQUID HANDLING PUMPS

A complete range of sizes in Rotating Plunger and Herringbone Gear Pumps to handle light or heavy liquids, sludges, slurries or viscous substances. Available in plain or steam jacketed models and built of special corrosion resistant metals where desired.

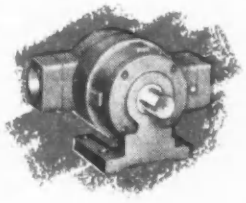


KINNEY VACUUM PUMPS

Single stage models to produce absolute pressure readings of 10 microns (.01 mm Hg.) . . . compound pumps producing readings of .2 microns (.0002 mm Hg.) or better. These Kinney High Vacuum Pumps are available in sizes for laboratory as well as high production use.

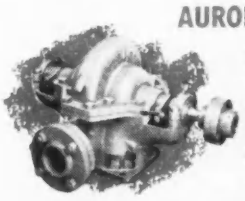
DUDCO DUAL VANE TYPE PUMPS

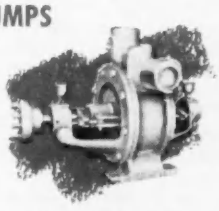
DUDCO Pumps provide a broad range of sizes with capacities to 120 gpm and pressures to 2000 psi. Also available in multiple units operating from a single drive. Hydraulic motors with starting torque outputs to 14,000 lb. in. at 2000 psi.



AURORA CENTRIFUGAL & TURBINE PUMPS

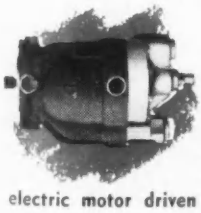
Deep well, sump, drainage and condensation return units, household water systems. Industrial low and high pressure liquid handling pumps. Direct motor and countershaft driven horizontal and vertical models. Capacities 3 to 7500 gpm.





STRATOPOWER PISTON TYPE PUMPS

Axial reciprocating piston type . . . constant or variable delivery with capacities of .25 to 10 gpm at nominal speeds of 1500 rpm with maximum of 4500 rpm . . . working pressures to 3000 psi . . . direct engine and individual electric motor driven models.



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For detailed information on the type of pump in which you are interested.

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OIL SHOW
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BOOTHS 84N & 85N

THE NEW YORK AIR BRAKE COMPANY
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Gentlemen: Kindly send additional information on the pumps I have checked.

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- ☐ Kinney Liquid Handling Pumps
- ☐ Stratopower Pumps
- ☐ Kinney Vacuum Pumps
- ☐ Dudco Pumps
- ☐ Aurora Pumps

Name .....

Address .....

City ..... State .....

News of Men in the Industry

C. P. Dimit, vice-president of production, director and member of the executive committee of Phillips Petroleum Company, retired April 1 after 23 years of service with the company and 50 years of service in the oil industry. **L. E. Fitzjarrald** succeeds Dimit as manager of the Production department.

C. P. Dimit

Dimit gained his first oil field experience as a roustabout near Van Buren, Ind. and went to work for the Gulf Pipe Line Company in 1910 in Oklahoma. In 1916 he joined Gypsy Oil Company and became general superintendent in 1922. Dimit joined Independent Oil and Gas Company as vice president and director in 1929 and when this company merged with Phillips in 1931, he moved to Bartlesville, Okla., as assistant to the general superintendent of production.

Later Dimit was promoted to superintendent, to vice president-production and became a member of the board of directors in 1938. Dimit will continue his activities with Drilling Research, Inc., a research organization of which he has been president since its organization in 1949.

•

L. J. Beckman of Cleveland, Ohio, has been named staff member of the executive department of Cities Service Oil Company (Del.).

•

Dr. Scott P. Ewing, Tulsa, corrosion engineer with The Carter Oil Company, received the Speller Award for outstanding contributions to corrosion technology in recognition of 30 years work in solving underground and underwater corrosion problems. The award was presented in Chicago recently at the annual convention of the National Association of Corrosion Engineers. A native of Smithfield, Utah, Ewing served as a research associate with the American Gas Association from 1928 until 1940. He has been at Carter's research laboratory in Tulsa since the end of World War II.

Dr. Scott P. Ewing

•

J. R. McWilliams, former executive vice president for The Carter Oil Company, has opened an office in Tulsa as a consultant in oil and gas management.

•

Cecil R. Phillips, area drilling superintendent for Shell Oil Company, has been transferred to Shell's Tulsa office to succeed **S. B. Deal**, who is transferred to Shell's Calgary area.

J. W. Hoover has been appointed president of Chevron Oil Company, subsidiary of Standard Oil Company of California. Hoover resigned as vice president of the Exploration department and director of The California Company, also a subsidiary of Standard Oil Company of California. Hoover began work in 1927 in Texas and advanced in the exploration departments of various Standard of California subsidiaries. Under Hoover's direction Chevron will conduct geophysical surveys for the parent company and its subsidiaries. Exploration activities hereafter will be conducted by the Exploration department with **L. I. Brown** as manager and the Land department with **T. C. Nugent** in charge.

•

E. F. Bullard, president of Stanolind Oil & Gas Company, Tulsa, was elected to the board of directors of the First National Bank and Trust Company.

•

R. M. Smith, Los Angeles, Calif., assistant to Continental Oil Company's western regional geologist, has been promoted to director of training for the company's Production department with headquarters in Houston. Smith succeeds **R. B. Sale**, recently promoted to director of executive development for Conoco. Smith joined Continental in 1948 as geologist and became western regional geologist two years later. Previously he was associated for 12 years with Panhandle Eastern Pipe Line Company at Kansas City, Mo. A native of Kansas City, Smith was graduated from the Colorado School of Mines, Golden, Colo.

•

G. L. Rowsey of Houston has resigned as president of Taylor Oil and Gas Company but will remain with the company as chairman of the board. **James L. Sewell**, former vice president, succeeds Rowsey as president.

•

Ray M. Hart, Mattoon, Ill., has been appointed assistant to John W. Brice, president of The Carter Oil Company at Tulsa, Okla.

•

Bert Wheeler, Wichita Falls, Texas, has organized the Rocky Mountain Oil Corporation with offices in Denver, Colo.

•

Henry J. DeLaune, formerly with Sohio Petroleum Company, has been appointed chief geologist for the Peterson Drilling Company, Shreveport, La.

•

John F. Partridge, Jr., district exploration superintendent at Casper, Wyo., for The California Company, has resigned to open practice as a consulting geologist-geophysicist in the Rocky Mountain area. Partridge has been associated with The California Company for 11 years.

•

Louis C. Stork has joined the staff of the API as supervisor of the Abstracting Section now being organized. A native of Brooklyn, N. Y., Stork received his B.A. from Yale University, his M.A. from Columbia University, and has been associated with The Texas Company since 1942.

Jack Aldred has joined Chance Drilling Company, Inc., Houston, as general superintendent. Aldred graduated from the University of Texas in 1942 and served in the Navy until 1946, at which time he went to work for The Texas Company as field and drilling engineer. Aldred was with The Texas Company until 1948 when he joined Baroid, Sales Division, National Lead Company.

Jack Aldred

•

Earl A. Brown, Jr., formerly of Houston, has been named head of the Legal department at Billings, Mont. for Socony-Vacuum Oil Co., Inc.

•

J. C. Byrd, formerly with Pan Am Southern Corporation, has joined the geological staff of Mid-States Oil Corporation at Shreveport, La.

•

J. R. Dorrance has been promoted to assistant division manager of the Pacific Coast Division of The Texas Company's Producing department. A graduate of the Colorado School of Mines, Dorrance took postgraduate work at the University of California, Berkeley, and began with The Texas Company as a geologist in 1929. Since 1945 he has been division geologist of the Pacific Coast Division. H. F. Ashauer, formerly senior geologist in the division, replaces Dorrance as division geologist. Ashauer, who obtained his Ph.D. in geology from the University of Goettingen, Germany, joined the company in 1936.

•

John S. Miller, Kansas district geologist for Champlin Refining Company, has resigned his position to become a partner in the firm of Graham-Messman - Rinehart Oil Company, independent oil company formed in 1950. Miller has headed the Wichita district office for 3½ years. A graduate of the University of Oklahoma, Miller is presently working on his M.S. degree. Other members of the firm are William L. Graham, Roger L. Messman and C. B. Rinehart. Messman and Rinehart formerly were with Continental Oil Company.

John S. Miller

•

Ralph E. Carder, formerly with Union Oil Company, Inc., has been named landman for Rocket Drilling and Derby Drilling Companies at Wichita, Kansas.

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MAY 14-23

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GENERAL OFFICES
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82 YEARS OF PROGRESS WITH THE OIL INDUSTRY

G. Frederick Shepherd, formerly chief geologist for General American Oil Company of Texas in Dallas has announced the establishment of a consulting firm to specialize in subsurface work. Shepherd, author of many papers on geological subjects, has done geological work in the Mid-Continent and Gulf Coast areas. Offices of the new firm will be located in the new Petroleum Services Building in Dallas.

G. F. Shepherd

George V. Myers has been named to the newly-created position of manager of the financial department of Stanolind Oil & Gas Company. Myers will be in the Tulsa general office.

•

C. O. Hopper has been made field superintendent in Stanolind Oil & Gas Company's Canadian Division and will supervise all producing operations throughout the division. Hopper received a B.S. degree in petroleum engineering from the University of Texas in 1947 and joined Stanolind in June of that year. He served in various engineering capacities in the company's producing operations in Texas until transferring to the Canadian division July, 1952.

Edwin J. Valencia, treasurer of Bishop Oil Company, has been elected to the company's board of directors to fill a vacancy created by the death of John M. Jennings of Houston. Valencia has been with Bishop Oil Company since 1927 and became treasurer in 1942. He also is a member of the board of directors of Canadian Bishop Oil, Ltd., Bishop Oil Company's Canadian subsidiary.

Edwin J. Valencia

•

Walter R. Fillippone has been appointed area manager for United Geophysical Company of Pasadena, Calif., in the Rocky Mountains and Williston Basin area. Fillippone received his M.S. degree from the California Institute of Technology in 1944 and has been associated with United since 1943, dealing primarily with Rocky Mountain exploration problems. Recently he was in charge of United's Alaskan operations. Fillippone will have headquarters in Denver, Colo. **Flint H. Agee** has been named area manager of United's West Coast area with headquarters in Pasadena. Agee has been with United as party chief and supervisor of California seismic and water parties since 1945.

•

Dr. John A. Hipple, chief of the atomic section, National Bureau of Standards, Washington, D. C., has been named director of the Mineral Industries Experiment Station at The Pennsylvania State College to fill the vacancy created by the retirement of **Dr. Alfred W. Gauger**, a faculty member for 21 years.

•

J. M. Hansell, chief geologist with the Rocky Mountain Division of Sun Oil Company, has returned to work in the Denver office after several months sick leave.

•

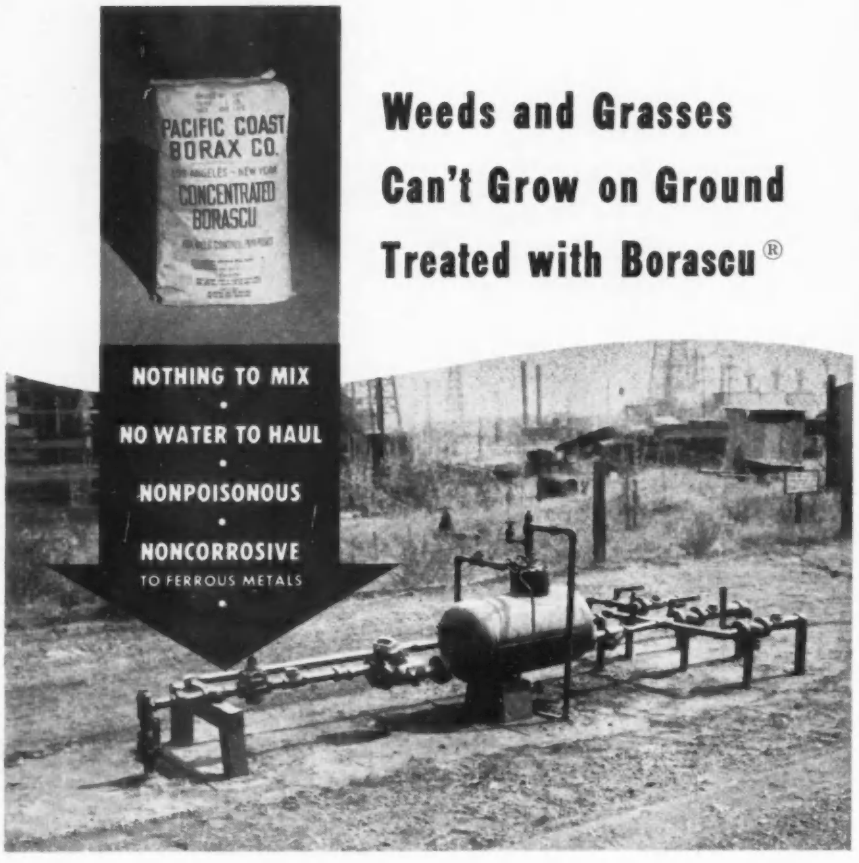
W. H. Ellis has resigned as head of the Land department of The Louisiana Land and Exploration Company to engage in the brokerage business. Ellis has been with the company for 14 years and was chief landman during the past 12 years. **Jack O. McCall**, formerly division landman in Midland, has been named to succeed Ellis. A graduate of Washington State College, McCall served in the United States Air Force for six years and holds a reserve commission as a lieutenant colonel. McCall was landman in the Midland office of the Standard Oil Company of Texas for five years before joining Louisiana Land and Exploration.

•

Chris F. Neely has been appointed staff engineer of the Liquefied Petroleum Gas Association to handle the organization's technical and safety activities. Neely will make his headquarters at the executive offices in Chicago.

•

Robert B. Bizal has been named associate editor of The Independent Monthly, official publication of the Independent Petroleum Association of America. Bizal, who received a Fulbright Scholarship in 1951, returned to the U. S. last September after a year's postgraduate study at the University of Paris and the University of Lyon, France.



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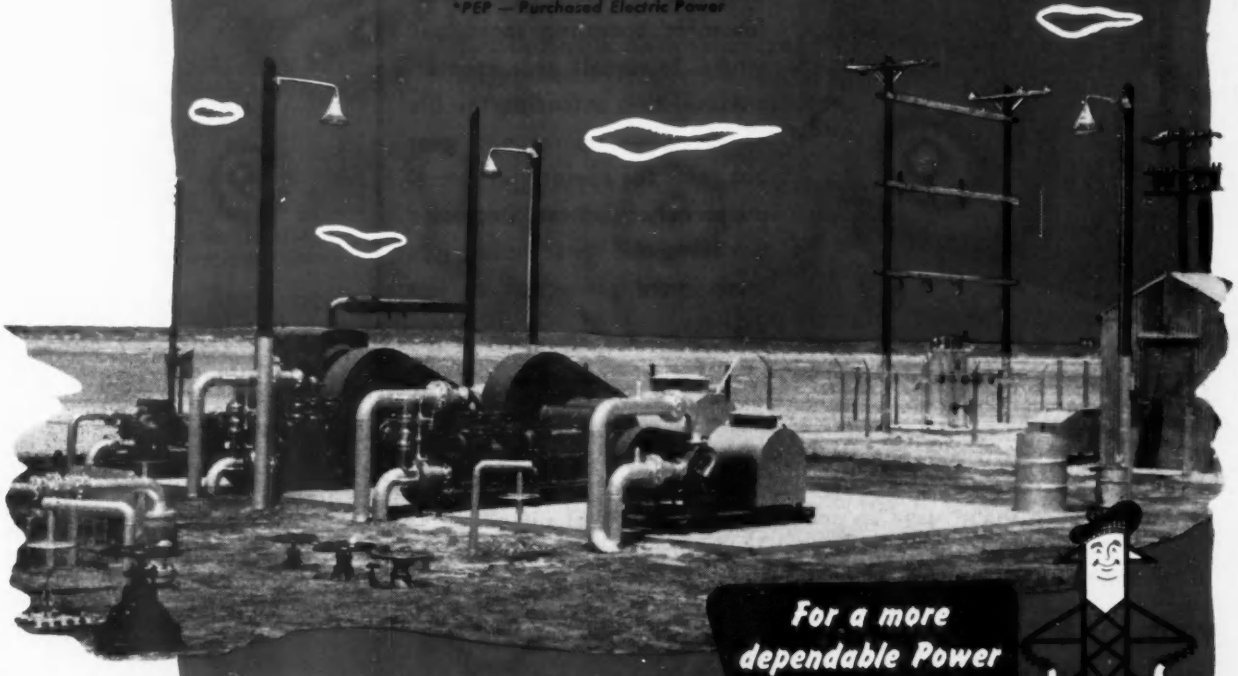

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Transfers and Promotions

The California Company has announced the appointment of **R. D. White** as assistant chief geologist, a new position. White will assist and supplement the chief geologist in providing geological counsel and guidance to geological personnel throughout the Exploration department. White's headquarters will be in New Orleans. **S. W. Totten** has been named division exploration superintendent of the Southeastern Division succeeding White. The Southeastern Division's geographic area has been expanded to include the entire state of Arkansas. The division will have two districts, the Alabama-Georgia-Florida district with headquarters at Pensacola, Fla., and the North Louisiana-Arkansas-Mississippi district with headquarters at Jackson, Miss. **L. C. Powell** replaces Totten as district exploration superintendent at Jackson and **C. W. Hagnas** is promoted to district landman of the North Louisiana-Arkansas-Mississippi district with headquarters in Jackson.

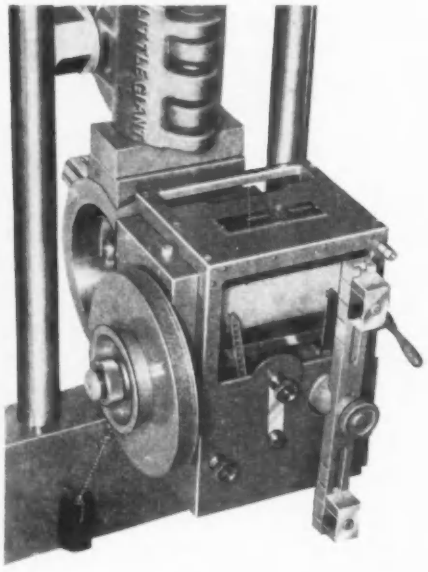
•

Five executives of White Eagle Oil Company and its wholly owned subsidiary, W. H. Helmerich & Payne, Inc., have been promoted to vice presidencies. These include **Herman Aweas,** promoted to vice president—drilling; **Harry Saye,** vice president—production; **Dee A. Siles,** vice president in charge of drilling contracts and public relations; **Harold E. Tips,** vice president—Land department; and Erik K. **Waering,** vice president—exploration.

KNOW THE FACTS...

Improve Your Pumping Wells!

J-F DYNAMOMETER *tells how . . .*



. . . production is increased with operational control! The J-F Dynamometer enables checking of pumps at surface; reduces number of sucker rod failures by determining the most favorable operating speed and stroke. It reveals poor counterbalance, thus extending the life of the prime mover and gear box; aids the operator in selecting proper equipment. Decreased downtime and fewer pulling jobs mean more production at less expense.

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DEATHS

E. C. McGurren, 46, Chicago division manager for Skelly Oil Company, died in Chicago on March 11.

•

Clifford G. Unruh, 56, a master mechanic with Tennessee Gas Transmission in Houston, died February 16 while working at Natchitoches, La.

•

Frank Garfield McClintock, 89, pioneer Tulsa oilman, died March 16. McClintock became associated with the oil industry in Ohio and moved to Independence, Kansas, in 1903. He went to Tulsa in 1907 as superintendent of production for the A. W. Shulthis interests and remained with them until his retirement in 1935.

•

George Hadley, 75, who brought in the first oil well in the Cuyama oil field in California, died in March in California.

•

Horace Clay, 69, of Tulsa, general counsel and director of Wilcox Oil Company since 1922, died April 5 in Tulsa. A former state senator and district judge, at Jefferson City, Mo., Clay moved to Tulsa in 1922.

•

L. P. Carpenter, 67, retired regional production manager of Continental Oil Company, died at Ponca City, Okla., on April 2.

•

Clyde Tapley, 44, lineman for United Gas Pipe Line Company at San Antonio, Texas, died March 14. Tapley was a veteran of more than 21 years service with the company.

•

Charles Drader, 78, Beverly Hills oil man, died in Hollywood, Calif., April 2. Drader joined the Kern River Oilfields of California, Ltd., now known as Kern Oil Co., Ltd., in 1912 serving as general superintendent, general manager, and a member of Kern's management committee. Drader retired in 1942 but continued to serve as consultant to the present local management committee of the company.

•

Willis Gridley, 55, of Tulsa, who was associated with A. G. Oliphant, Oklahoma independent oil man, died March 24.

•

Alfred E. Ballin, 70, consulting engineer and former member of the Tulsa Utility Board, died March 23. Ballin had resided in Tulsa since 1936.

•

DeWitt Hansen, 73, retired independent oil producer, died March 23. Hansen retired in 1937.

•

Clarence F. Caldwell, 53, of Tulsa, Okla., tax accountant and attorney for W. G. Skelly of Skelly Oil Company died March 29.

•

Louis L. Metzger, 76, retired Oklahoma oil operator, died March 27. Metzger was associated with the old O.P.R. Production Corporation, which was acquired by The Pure Oil Company, and later worked as a contractor in eastern Oklahoma.

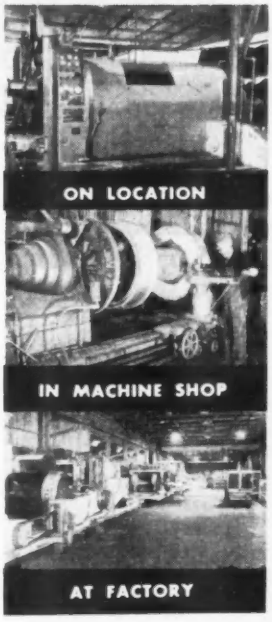
•

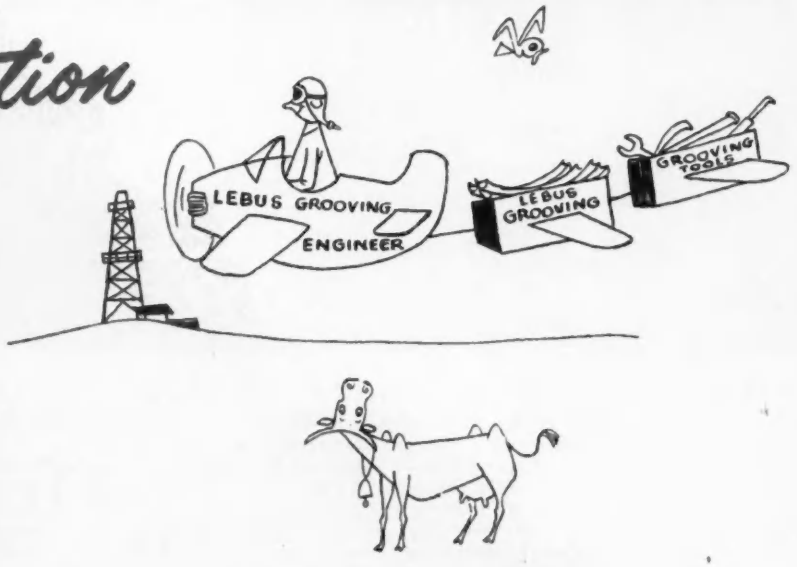
Roy C. Busby, 66, vice president and director of the Whitehill Oil Corporation, Tulsa, died April 6. Busby was a native of McCune, Kansas.

PAGES FROM THE LEBUS WIRE LINE SPOOLING HANDBOOK

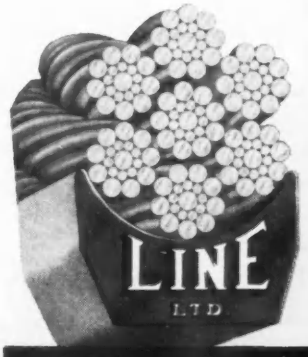
LeBus Grooving and Controlled Pyramid Spooling *

Installation





LeBus Engineers have designed their grooving and spooling system to fit any drilling rig on the market today and through their installation procedure are able to install the system within a minimum amount of time. They can make this grooving installation without dismantling the hoisting unit on location where the drilling rig is operating, in the drilling contractor's yard, in the machine shop, or in the factory where the drum can be grooved before being installed in the drawworks frame.



LeBus has kept pace with the changing demands imposed by steadily increasing depths, new drilling methods, and the ever-changing types of drilling equipment. Constant study of the requirements of the equipment on which the LeBus Grooving System is installed, coupled with the close control of quality of the grooving while it is being manufactured, assures the operator the finest grooving and spooling service obtainable with the greatest efficiency and economy.

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Association News

Mid-Continent District API Officers

Officers of the Mid-Continent District of the Division of Production, API, chosen March 20 in Tulsa are, left to right, G. C. MacDonald, Gulf Oil Corporation, Tulsa, retiring district chairman who is the new chairman of the District Advisory Committee; Jack Abernathy, Big Chief Drilling Company, Oklahoma City, new district chairman; K. M. Farnsworth, The Atlantic Refining Company, Duncan, Okla., area vice chairman for the southwestern Oklahoma area; R. B. McCloy, Stanolind Oil & Gas Company, Oklahoma City, secretary-treasurer; C. A. Husted, contractor, Pampa, Texas, area vice chairman for the Texas Panhndle; William Pugh, Lane-Wells Company, Great Bend, Kansas, area vice chairman for western Kansas; and Glenn Gillespie, Gillespie and Sons Drilling Company, Cushing, Okla., area vice chairman for the Drumright area. Officers not pictured include H. J. Bourke, Warren Petroleum Company, Maysville, Okla., area vice chairman for the Golden Trend area; R. B. (Cotton) Rundle, Happy Belting Company, Seminole, area vice chairman for the greater Seminole area; and James Puckett, Magnolia Petroleum Company, Wichita, area vice chairman for eastern Kansas.

Geological Society Plans Spring Field Trip May 29-30

The West Texas Geological Society's 1953 spring field trip will take place May 29-30 in the Chinati Mountains of Presidio County, north of Presidio, Texas. During the trip a study of Permian reefing and Permian and Pennsylvanian rocks will be made and the Cretaceous and Permian Rocks of Pinto Canyon will be studied.

Robert H. Cress of Gulf Oil Corporation and Cecil C. Rix of the University of Texas are leaders of the trip. Registration takes place May 28 at 3 p.m. in the lobby of the Paisano Hotel, Marfa, Texas. Geologists, students and others interested in the geology of the area are invited to attend the trip. The Hotel Committee of the society will arrange for reservations.

Abilene Geological Society Announces 1953 Officers

The Abilene Geological Society recently announced its panel of 1953 officers, headed by Harold S. Edwards, district geologist for Stanolind Oil and Gas Company, president.

Other officers include Arthur L. Jenke, geologist for Fain & McGaha vice president; Charles M. Forney, Chicago Corporation, reelected secretary, and Ben J. Sorrell, Superior Oil Company, treasurer.

Secretary of Interior to Meet With Petroleum Council

Secretary of Interior Douglas McKay will meet with the National Petroleum Council May 28 in Washington to discuss matters relating to the continuation of defense agencies. Walter S. Hallanan, chairman of the council, said chairmen of the council's committees studying the use of radio and radar in the oil and gas industry, petroleum productive capacity, submerged lands productive capacity, and oil and gas exploratory and development requirements will report to the full membership.

M.I.T. To Offer Course In Lubrication Engineering

A special summer program from June 16 to June 26 at the Massachusetts Institute of Technology will include a study of the applications of new methods in lubrication engineering. The course is designed primarily for engineers responsible for lubrication maintenance and scheduling in industrial plants and for chemists and others in the oil industry wishing more information in the field. Professor Brandon G. Rightmire, who is in charge of the Lubrication Laboratory in the M.I.T. Mechanical Engineering Department, will supervise the program.

Information may be obtained from the Director of the Summer Session, Room 3-107, M.I.T., Cambridge 39.

Southern Gas Association To Meet in New Orleans

The Southern Gas Association's 45th Annual convention will be held in New Orleans, La., May 11 to 13. Among the speakers will be Senator George A. Smathers of Florida and Dr. Alfred P. Haake of Park Ridge, Ill., economist and consultant to General Motors.

Convention committee chairman is Charles F. Stubbs of Alabama Gas Corporation, Birmingham, and vice chairmen are Curtis M. Smith, Tennessee Gas Transmission Company, Houston, for the gas companies; and Charley Lockhart, Jr., Bryant Heater Division, Dallas, for the manufacturers. W. M. Nunn, Sr., New Orleans Public Service, is chairman of local arrangements.

Meetings will be held in the Jung Hotel, convention headquarters, and in the Roosevelt Hotel. A luncheon and tour of the French Quarters for the ladies is included in the program.

Hotel reservation requests should be mailed to Southern Gas Association Housing Committee, 1932 Life of America Building, Dallas, Texas.

Phase Behavior To Be Studied In Summer Course in Michigan

A course designed for young engineers in industry who are to enter work involving phase behaviour will be offered during the summer at the University of Michigan College of Engineering. Scheduled for from June 16 to June 30, the course will be followed by a research conference July 1 and 2.

Four areas of concentration to be included in the course are phase rule and its application to hydrocarbon systems, the separation of azeotropic mixtures, low temperature processing, and phase behavior in petroleum reservoirs.

Correspondence concerning the course on the research conference should be directed to Donald L. Katz, 2028 East Engineering Building, Ann Arbor, Mich.

American Gas Association Names Committee Chairman

James F. Oates, Jr., chairman of The Peoples Gas Light and Coke Company, has been named chairman of the 1953 Promotion, Advertising and Research Committee of the American Gas Association. Stuart M. Crocker, chairman of the board of The Columbia Gas System, Inc., New York, and C. H. Zachry, president of Southern Union Gas Company, Dallas, are vice chairmen.

The PAR committee raises and expends funds annually in programs of promotion, advertising and research for the benefit of the gas industry.

Annual Field Trip Planned

The Intermountain Association of Petroleum Geologists has made plans for the fourth annual field conference in northern Utah and Southeastern Idaho the latter part of June. A three-day trip beginning at Ogden, Utah, and ending at Jackson, Wyo., is scheduled. Overnight stops will be made at Montpelier, Idaho, and Afton, Wyo.

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THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

News of Service and Suppliers

Bovaird Officers Attend Conference

Attending the recent annual sales and management meeting of the Bovaird Supply Company at Tulsa were representatives from 22 offices and stores in five states. Officers attending were, seated, D. D. Bovaird, president; and, standing left to right, Frank D. Bovaird, vice president; Roscoe G. Ayers, vice president and general manager of sales; Raymond E. Batchelor, general manager of stores; T. H. Trower, treasurer; R. M. McMahan, secretary and purchasing agent and W. J. (Bill) Bovaird, assistant to the general manager of stores.

American Iron & Machine Works Celebrates 30th Anniversary

In conjunction with the company's celebration of its 30th anniversary, American Iron & Machine Works Company awarded service pins for five years or more continuous service to 128 employes representing more than 1200 years of combined service.

Organized in 1923 by John F. Cailloux, the company first manufactured only two items—overshot and a sucker rod socket. In 1926 the firm moved from Three Sands, near Tonkawa, Okla., to the present location in Oklahoma City. Today the American Iron & Machine Works manufactures many kinds of oil field equipment including rotary drilling and production tools and tool joints. American Iron oil field equipment is distributed on a worldwide basis through oil field equipment supply companies.

Watts Named Sales Manager Of Colorado Fuel and Iron

L. A. Watts has been named general manager of sales of the eastern division of The Colorado Fuel and Iron Corporation. Watts has been assistant general manager of sales of the Wickwire Spencer Steel Division of Colorado Fuel and Iron. Previously he established and managed the Pig Iron and Semifinished Sales department of the Wickwire Spencer Steel Division of Colorado Fuel and Iron.

Hughes Tool Plans Expansion

Plans have been announced for a three-year expansion program which will increase the capacity of Hughes Tool Company's Houston plant approximately 40 percent. The increased capacity of the plant will further boost the company's payroll of 5,000. Recently Hughes Tool Company opened a new research and engineering laboratory in Houston.

Stearns Named Regional Head For Clark Equipment Company

Dan Stearns has been named by the Clark Equipment Company of Buchanan, Battle Creek and Jackson, Mich., to be manager of its newly-created midwestern region with headquarters in Chicago.

Assisting Stearns in management of the new sales region will be Glen R. Johnson, a national account representative of the company for the past six years. Stearns succeeds A. G. Morrison, who has become the Clark dealer in a new sales territory comprising the western half of Michigan.

Reeder Is Named to Board Of Allis-Chalmers Directors

Rex Reeder, executive vice president of Marine National Exchange Bank, Milwaukee, has been elected to the board of directors of Allis-Chalmers Manufacturing Company.

From 1937 until 1939 Reeder was a partner in a Chicago management consultant firm. He began his banking career with the Chase National Bank of New York. Reeder also is director of Marine National Exchange Bank, Charles A. Krause Milling Company, Plankinton Building Company, Phoenix Hosiery Co., and Red Star Yeast & Products Company.

G & C Company to Handle Carter Pumping Units

S. C. Carter Company, Inc., Los Angeles manufacturers of the Carter long-stroke hydraulic pumping unit, announce the appointment of G & G Machine and Equipment Company as distributor of the product in Oklahoma.

Operated by Dick Gordon and Jack Gant, G & G maintains complete machine shop facilities and will handle sales and service of the Carter units from their headquarters at Healdton, Okla., and branch in Tulsa.

Paul Courtney Named Director Of Unit Rig & Equipment

The Board of Directors of Unit Rig & Equipment Company, Tulsa, Okla., elected Paul Courtney a director and appointed him president of the company to succeed Ray E. Carter, Tulsa, who becomes chairman of the board.

Paul Courtney

Courtney formerly was associated as vice president with Emsco Derrick & Equipment Company of Houston and Los Angeles, where he served in various manufacturing and sales capacities since 1938. Courtney has been associated with the petroleum industry many years, working with oil field supply companies, and spent several years in foreign service in Venezuela. Courtney will have headquarters in Tulsa.

Youngstown Sheet and Tube Announces Two Promotions

The Youngstown Sheet and Tube Company has announced the appointment of Emil A. Vierow as superintendent of the Youngstown district Fuel and Power department and the promotion of Frank C. Sterling from the Yoloy sales office in Youngstown to its district sales office in Pittsburgh, Pa.

Vierow has been associated with Clairton Coke Works of United States Steel; the Fuel department of Jones and Laughlin Steel Corporation at the Pittsburgh works; Alan Wood Steel Company; and American Steel & Wire Company. Vierow joined Youngstown as superintendent of the Fuel department and now has charge of both fuel and power.

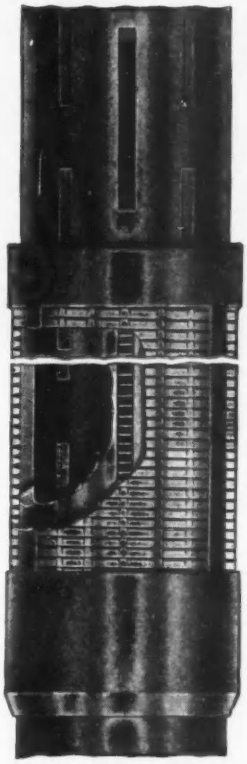
Sterling joined Youngstown in 1936 as a hall boy and advanced to the Pricing department, flat rolled sales, and Yoloy sales. After serving in the armed forces from 1941 to 1945, Sterling rejoined the firm.

C & S and Trans World Airlines Offer Direct One-Plane Service

Chicago & Southern and Trans World Airlines are cooperating in presenting direct-plane deluxe Constellation service to Pittsburgh and New York. Under the authorization to interchange equipment and flight crews, the Civil Aeronautics Board approved in December, 1952, the establishment of new direct one-plane service between Houston and New York, one route via St. Louis and Pittsburgh and the other route via Shreveport, Memphis, Indianapolis and Pittsburgh.

Daily round trip service over each route began April 1 using TWA Constellations and Martin 4-0-4 Skyliners. TWA 57-passenger Constellations serve the Houston-New York route stopping at St. Louis and Pittsburgh, and TWA Martin 4-0-4 Skyliners, 40-passenger planes, service the Houston-New York route via Shreveport, Memphis, Indianapolis and Pittsburgh. The two new flights will be morning departures.

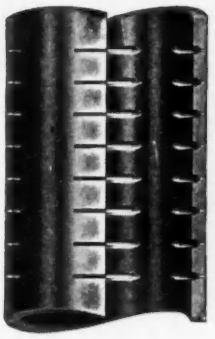
EMSCO SLOTTED . . .



A SUPERIOR SCREEN FURNISHED IN A FULL RANGE OF SLOT GAUGES

With Emsco, the manufacture of slotted screen pipe is serious business. Our shop is equipped with machines designed especially for this purpose . . . machines that produce high quality slotted screen pipe, with slots ranging from .010 to .100 or larger if required.

We're proud of our facilities for producing this full range of slotted pipe. We're proud, also, of the record established by Emsco Slotted Pipe in wells all over the world. It retains from 80% to 85% of the original collapse strength of the pipe . . . it may be spudded or rotated reasonably without damage . . . may be easily cut and pulled . . . and its V-shaped slots provide maximum drainage with minimum clogging. It's furnished, of course, in all popular sizes of pipe, to lengths as specified.



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Emsco also manufactures "Vertical Slotted" Wire Wrapped Screen, with slotted openings that stay open longer, provide more drainage area per foot and retain 25% more strength than pipe with drilled holes with equal area.

For full information on Emsco "Slotted" and "Wire Wrapped" Screen Pipe, write for a copy of our latest catalog.

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Export Representative: Val R. Wittich, Jr., 30 Rockefeller Plaza, New York 20, N. Y.

KEEP YOUR MUD IN BALANCE with

"Mud-O-Graf"

- Provides accurate information for uniform mud control.
- Helps prevent blowouts by showing the duration and relative amount of gas in gassy streaks.
- Eliminates guess-work in the use of weighting materials, chemicals, and water.
- Indicates graphically all heavy and light streaks in the circulating system.

The condition of mud in the hole is recorded automatically during every minute of the drilling operations. Weight variations of less than 1/10-pound per gallon can be detected. Mud-O-Graf has been proved in twelve years tough field service. It eliminates trial and error methods of adding weighting materials. It detects gas or salt water incursions which could cause blowouts.

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Manufacturers and Distributors of
Rig Runner and Pit-O-Graf

. . . another reason why drillers prefer

Standco NO-SMOKE BRAKE LINING

Standco Brake Blocks are made of cabled cords of long fibre asbestos — woven solid and reinforced with bronze wire to prevent pulling loose on the bolts. They will not burn or smoke or score brake rims.

More deep wells have been drilled with Standco than with all other blocks combined. It's your answer for low-cost hole-making.

STANDCO BRAKE LINING COMPANY

Factory and General Offices
2701-2801 Clinton Drive Houston, Texas

R. L. Hanes to Head Sales For Colorado Fuel & Iron

R. L. Hanes has been named assistant to the vice president—sales of Colorado Fuel and Iron Company. Hanes joined the company in 1929 and after working in several departments in the Pueblo plant and mines, he was transferred to the Sales department in 1936. Hanes has represented the Sales department at Wichita, Phoenix and Houston. Upon his return from the Navy in 1945, Hanes was assigned to the general sales office in Denver and later became district manager in Fort Worth. In 1949 Hanes became manager of the wire product sales in Denver.

R. L. Hanes

First National Bank Elects Doherty to Directors Board

W. T. Doherty of Houston has been elected to the Board of Directors of the First National Bank in Houston. Doherty is president of the Mound Company, vice president of the Fidelity Oil and Royalty Company, a member of the American Petroleum Institute and the American Society of Petroleum Geologists, and past national chairman of the Drilling Practices Committee. He is co-author of the petroleum engineering textbook, "Practical Petroleum Engineering."

American Cyanamid Company Announces Two Promotions

L. C. Perkinson has been named vice president of American Cyanamid Company, New York, and G. C. Walker has been elected treasurer of the company. Perkinson was treasurer since 1945 and a director since 1946 while Walker had served as assistant treasurer since 1951.

Perkinson was with the Hanover Bank and practiced public accounting before joining Cyanamid in 1921. He was elected assistant treasurer and comptroller in 1939. Perkinson is a director of Southern Minerals Corporation, and Jefferson Chemical Company, Inc. and an officer or director of other Cyanamid subsidiaries.

Walker joined Cyanamid's Accounting department in 1933, becoming assistant manager of the Tax department in 1939 and manager in 1945.

Wagner Joins C-R-C Supply As Houston Representative

William E. Wagner, formerly with Charles Wheatley Company, has joined C-R-C Supply Division, a division of Crutcher-Rolfs-Cummings, Inc. as a representative in the Houston area.

A World War II veteran, Wagner has been with Charles Wheatley Company for 5½ years in the Tulsa and Houston areas.

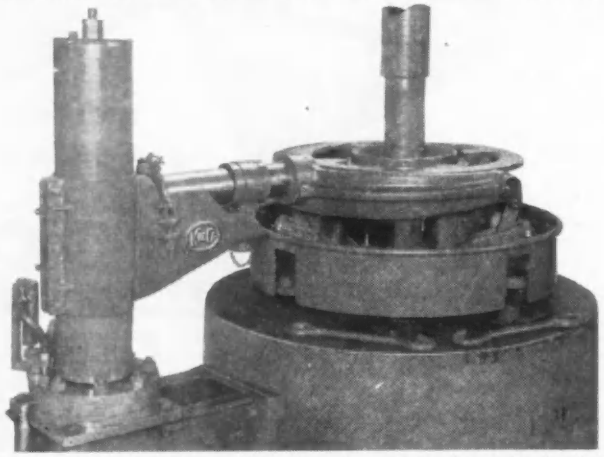
New U. S. Steel Works Plant

United States Steel Corporation completed the new Fairless Works at Morrisville, Penn., late last year. The plant began to produce iron and steel about December 11 in its two blast furnaces which have a capacity of 1.2 million net tons annually.

WELCOME TO THE

KELCO OIL SHOW

AND TO OUR EXHIBIT ON SILVER LANE—BOOTHS 36 & 37



The famous Ke.Co Air Operated Power Slips will be in operation in our booths. KelCo Spinning Line and Breakout Catheads will be on display on many of the rigs of other exhibitors. Our phone number at the Oil Show is 6-1776

Be Safety Wise—KelCo-ize

Representatives in all principal oil fields

KELCO BEN F. KELLEY CO., Inc.
TULSA, OKLAHOMA

SPINNING LINE CATHEADS • BREAKOUT CATHEADS • AIR OPERATED POWER SLIPS
TUBING TONGS • SAFETY "C" POLISHED ROD CLAMPS

To Attend Oil Show

W. G. Skelly, seated, Tulsa oil man and president of the International Petroleum Exposition to be held May 14-23 in Tulsa, receives a letter from Miss Catherine Connell, president of the Chicago Desk and Derrick Club, announcing her organization's plans to attend the Oil Show. Delivering the letter is W. L. Carr, district sales manager for Braniff International Airways in Tulsa. An invitation to the group and to all oil executives was aboard the first non-stop Braniff airplane from Tulsa to Chicago March 15.

Special Transportation To Oil Exposition Planned

Special reservation and transportation facilities for oil men attending the International Petroleum Exposition in Tulsa May 14-23 have been planned by railway and airlines serving the Tulsa area.

Braniff International Airways will have extra airlines available to handle the travel to and from the exposition. For stepped-up travel expected between Chicago and Tulsa, Braniff recently inaugurated a new non-stop DC-6 service and christened the first Chicago-bound airliner "The Oil Special."

On the spot reservation service out of Tulsa will be supplied by Braniff from a booth on the exposition grounds. Direct phone connections between the booth and the Tulsa reservation office will be set up to handle requests and bilinguists will provide interpreter service for Latin American visitors.

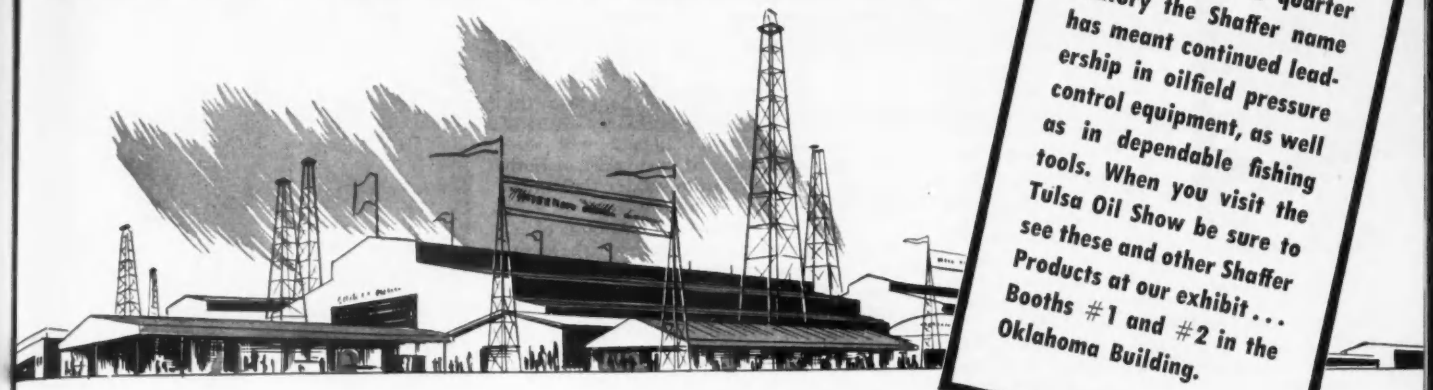
In addition to increased airline service from all parts, the railways are making plans for heavy traffic. Oil men from the Houston, Texas, area can travel on the Southern Pacific's Sunbeam to Dallas and ride the Frisco to Tulsa.

Gulf Forge Company Increases Personnel to Meet Demand

The Gulf Forge Company, a new Houston concern specializing in hammered steel forgings for manufacturers of oil field equipment, has added additional working shift to supply the increasing demand for company products. Headed by Neil G. Nuthall, president and general manager, Gulf Forge produces hammered forgings in sizes ranging from ten pounds to one ton.

Gulf Forge is on a two-acre site with a railroad siding. The original shop, a metal building 100 by 50 feet, has been in operation since July 1, 1952. Equipment includes 10,000-pound, 8000-pound, and 2500-pound steam open-frame hammers.

See these SHAFFER PRODUCTS at the TULSA OIL SHOW



For more than a quarter century the Shaffer name has meant continued leadership in oilfield pressure control equipment, as well as in dependable fishing tools. When you visit the Tulsa Oil Show be sure to see these and other Shaffer Products at our exhibit . . . Booths #1 and #2 in the Oklahoma Building.

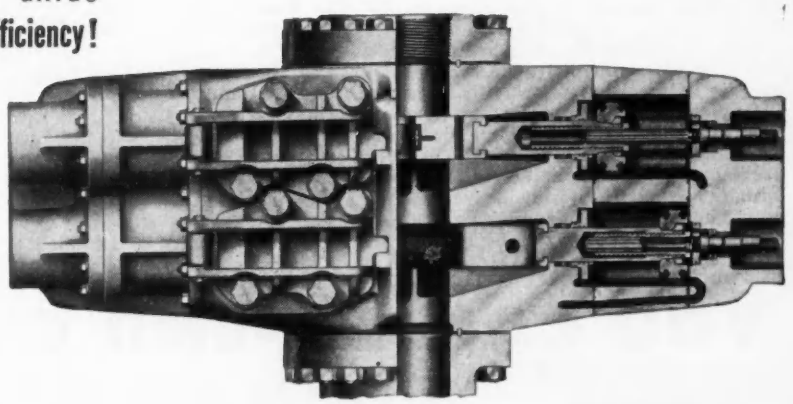
SHAFFER HYDRAULIC CELLAR CONTROL GATES

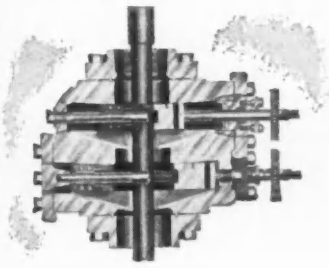
. . . Revolutionary in compactness, simplicity, efficiency!

Available in both Double (illustrated right) and Single types. Both types are amazingly compact—Double type only 30" high, Single type only 18½" high, even in sizes as large as 13⅜" (12" Series 900).

Rams are changed by simply opening side doors, replacing rams, then closing and bolting the doors. *And rams can be changed whether pipe is in or out of the hole!*

With all moving parts completely enclosed, this Gate is ideal for *all* drilling operations. There are many other important advancements built into this Gate, so be sure to get the complete story before you invest in *any* control gate equipment. Available in a complete range of sizes and pressure ratings!

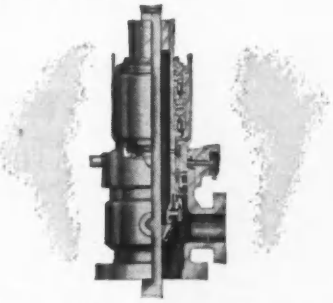




SHAFFER MECHANICAL CELLAR CONTROL GATES

- Available in both Double (illustrated above) and Single types for operation by air, electric or steam drive —*plus complete manual stand-by operation!*
- Require minimum space—less than 29" for Double, 19" for Single, even in sizes as large as 13⅜" (12" Series 900).
- Self-Draining Ram Compartments, with no place for detrimental mud to accumulate and interfere with free ram travel . . . Quick, Easy Ram Changes by simply removing *one* end cover . . . and many other unique features make these gates outstanding in their field.

Domestic or overseas, wherever your operations call for mechanically-operated cellar control gates, Shaffer has the most advanced design available!

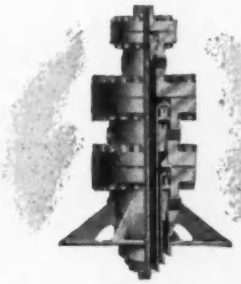


SHAFFER COMBINATION ROTATING BLOWOUT PREVENTERS AND STRIPPERS

—Combine in One Unit Every Necessary Feature for Complete Pressure Control While Drilling.

- Can be used with *any* standard kelly —square, hexagonal or octagonal; any type drill pipe—coupled, upset or flush. No special strings or equipment needed!
- Maintains continuous seal around pipe, couplings, tool joints, upsets, subs, drill collars, etc. *automatically* —whether string is rotating, being raised, lowered, or is stationary.
- Quick Releasing Bonnet permits lifting bits, reamers, other large-diameter tools through the unit quickly, easily. . . . and many other unique features!

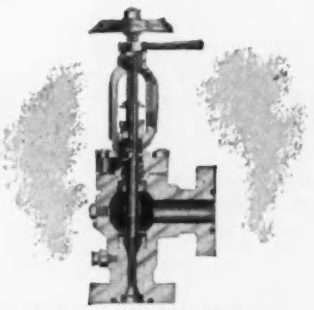
Nothing equals this unit for maintaining complete pressure control while the drill string is in the well. Available in a complete range of sizes.



SHAFFER LANDING HEADS AND TUBING HEADS

—Meet Every Requirement for Modern Compact Casing and Tubing Suspensions The World Over.

- Available in various types and packing arrangements. Base Heads and Combination Base, Casing and Tubing Heads are available for combining several units into one where space is at a premium.
- Shaffer provides a full line of modern Tubing Heads, Multiple Zone Hook-Ups and other equipment to complete your pressure control installation—for conditions anywhere in the world!



SHAFFER ADJUSTABLE FLOW BEANS

—The Pioneer Adjustable Flow Bean that Provides Operating Features Unequalled By Any Other Equipment.

- Available with Conical, Micro and electrically-heated Thermo Tips in both regular and hard metal designs to meet various drilling, production and refinery applications. All popular sizes—in both flanged or screwed connections—to meet your particular requirements.

ALSO, SHAFFER FISHING TOOLS!

In addition to pressure control equipment, Shaffer also provides one of the most complete lines of dependable fishing tools in the industry. Not only all conventional types—but many tools that are unique in operation and purpose. Write for complete information!

See this equipment at the Tulsa Oil Show. Also write for your free copy of the new Shaffer Catalog.

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS, Brea, California • California Service Shops: Santa Fe Springs and Taft
HOUSTON, TEXAS, 6006 Navigation Blvd. • ODESSA, TEXAS, 1925 West Second Street
OKLAHOMA CITY, OKLAHOMA, Acme Oil Tool Company, 1001 S. E. 29th Street
CASPER, WYOMING, Shaffer Tool Works, Post Office Box 1788
EXPORT SALES OFFICE: Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U.S.A.

30 years OF OIL TOOL LEADERSHIP

Westinghouse Air Brake Buys George E. Failing Supply

Purchase of the George E. Failing Supply Company of Enid, Okla., by the Westinghouse Air Brake Company of Pittsburgh, Penn., has been announced. Under the purchase agreement, Failing will be operated as the George E. Failing Company, a subsidiary of Westinghouse Air Brake Company, and George E. Failing will be president of the company.

George E. Failing

The Failing Company manufactures rotary type, portable truck and trailer-mounted seismograph shot hole rigs, core drill rigs, shallow production rigs, large hole irrigation rigs, blast hole rigs, uranium mining rigs and electric logging machines.

Organized in 1931, the company is the largest producer of portable drilling rigs for oil, water and mineral exploration. Before World War II, most of the company's products went to the petroleum industry. Today, approximately half of its volume is derived from sources outside the industry, principally the water well industry. A special water well division was formed to supply equipment for large irrigation projects and for domestic wells. Failing equipment also is widely used in drilling wells for air conditioning, in coring formations in the worldwide search for uranium and other minerals, and by the Armed Forces.

Great Lakes Carbon Corporation Purchases Alexite Properties

Great Lakes Carbon Corporation, Perlite Division, has purchased all properties of the Alexite Engineering Division of the Alexander Film Company. Alexite, a pioneer producer of perlite ore, is one of the largest perlite companies in the nation. Included in the transaction are Alexite's mine at Rosita, Colo., and mill at Florence, Colo.

Great Lakes Carbon will operate the Alexite mine and mill, utilizing existing equipment and personnel, and will ship perlite ore to established customers of both companies for distribution under the tradename "Permalite." The decision of the Alexander Film Company to dispose of its Alexite Engineering Division was brought about by plans to concentrate operations in the motion picture and television film business.

Beckman Instruments Announces Promotion of James Wilkinson

James D. Wilkinson has been named manager, Market Research Division, Beckman Instruments, Inc. Formerly manager of Commercial Research at Soule Steel Corporation, San Francisco, and regional research manager for Kaiser Aluminum and Chemical Sales Corporation, Chicago and Oakland, Wilkinson received his education at the University of California, where he received the first degree given in public relations. He also attended the University of Houston and Los Angeles City College. Wilkinson will move to Fullerton, Calif., when the new Beckman plant is completed in the fall.

Joe Clark Blackie Clark

Sievers Company Announces Appointment of Executives

William E. Sievers has announced the formation of the Sievers Company of Texas to further the sales and service of Kingseal and Queenseal and certain new process techniques in combatting lost circulation problems.

Blackie Clark, and Joe Clark, formerly with Halliburton and Spartan, are directors, vice presidents and shareholders of the corporation. Blackie Clark will manage West Texas and New Mexico with headquarters in Odessa while Joe will control the Gulf Coast from New Orleans to the Texas valley with headquarters in Houston. Manufacturing facilities for the products are located in San Antonio.

Huggins and Baudino Elected Officers of Westinghouse

E. V. Huggins has been elected vice president—corporate affairs and Joseph E. Baudino elected vice president—operations of Westinghouse Electric Corporation.

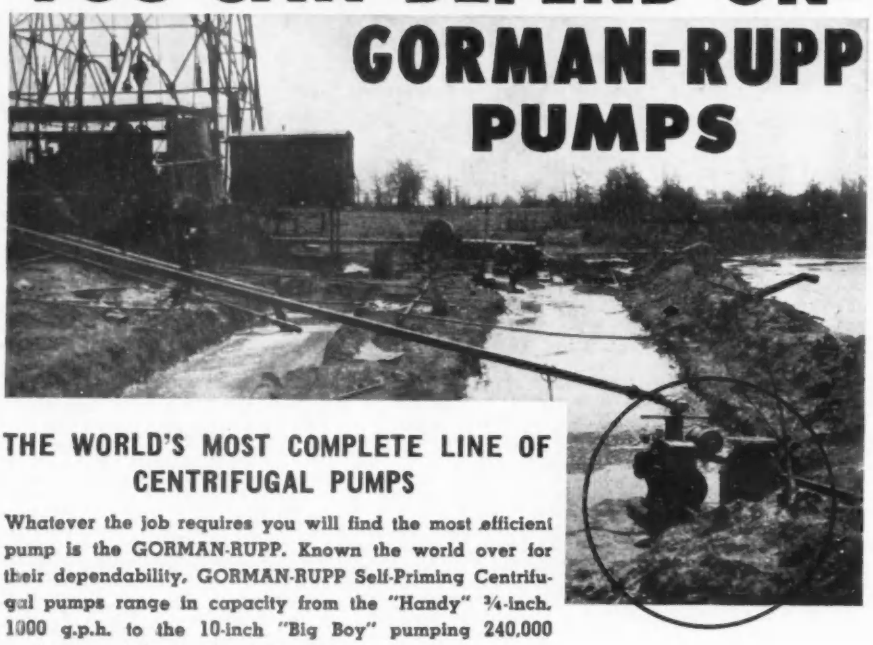
Huggins also was elected president of Westinghouse Radio Stations Inc. Huggins has been assistant secretary of the United States Air Force with general supervision over the Air Force's worldwide installations, its overseas and offshore procurement program and relationships with civil aviation. Huggins resigned as executive vice president of Westinghouse Electric International Company in 1951 to accept the Air Force job.

Moore and Paulsen Receive Oil Well Supply Promotions

William A. Moore, manager of U. S. Steel's Oil Well Supply Division's branch store at Avenal, Calif., for the past five years was appointed district representative in the San Joaquin Valley district and Paul S. Paulsen was named to succed him as store manager at Avenal.

Moore will serve the western part of the San Joaquin Valley with headquarters at Avenal. More had five years of oil field experience before joining "Oilwell" ih 1947. Paulsen joined the company in April, 1951, as a field representative at Avenal.

YOU CAN DEPEND ON-
GORMAN-RUPP PUMPS



THE WORLD'S MOST COMPLETE LINE OF CENTRIFUGAL PUMPS

Whatever the job requires you will find the most efficient pump is the GORMAN-RUPP. Known the world over for their dependability, GORMAN-RUPP Self-Priming Centrifugal pumps range in capacity from the "Handy" ¾-inch, 1000 g.p.h. to the 10-inch "Big Boy" pumping 240,000 g.p.h.—over 15 tons of water a minute.

MID-CONTINENT AND GULF COAST OILFIELD REPRESENTATIVE
HENRY H. PARIS DISTRIBUTOR, INC.
1125 Rothwell Street, Houston, Texas

THE GORMAN-RUPP COMPANY
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COLUMBIAN
BOLTED STEEL TANKS

International Leaders for Low-Cost Storage

The Columbian Trade Mark is internationally known as the sign of recognized leadership in storage tanks that have given long-life, economical service for 60 years in oil fields all over the world. Precision engineering, exclusive construction features, and easy erection combine to assure every tank being a profitable investment. Columbian Bolted Steel Tanks available now to meet your every need.

Columbian COP-NIC Tanks especially for sour crude will again be available when conditions permit.

COLUMBIAN ALL-METAL BUILDINGS

Save money on all your housing needs with these rigid, strong, fire-safe buildings. Ideal as warehouses, engine houses, garages, shops, compressor and equipment houses. Sectional construction assures easy, low-cost erection. Require minimum upkeep. Write for complete information.

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Jackson Equipment Co.
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Westex Tank Company
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Columbian Steel Tank Co.
(Warehouse)
3705 McKinney Ave.
Houston, Texas

B. A. Box
P. O. Box 42
Beeville, Texas

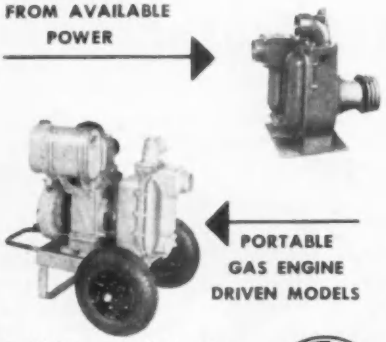
WYOMING
O'Neill Tank Company
P. O. Box 154
Casper, Wyoming

COLUMBIAN STEEL TANK CO., P. O. Box 4048-G, Kansas City, Mo.

PUMP TROUBLE ?

Switch to Marine Products Co.'s Flomax line of ruggedly constructed self-priming centrifugals to end pump breakdowns.
The FLOMAX pumps are designed to last—to give long life on nasty jobs. They're "Built for the Sea."

BELT DRIVE FROM AVAILABLE POWER



PORTABLE GAS ENGINE DRIVEN MODELS

- All Bronze and Cast Iron Bronze fitted models.
- Mechanical Seal and stuffing box styles.
- Stationary and mobile mountings.

MP MARINE PRODUCTS CO.

Available at leading oil field stores.

MARINE PRODUCTS COMPANY
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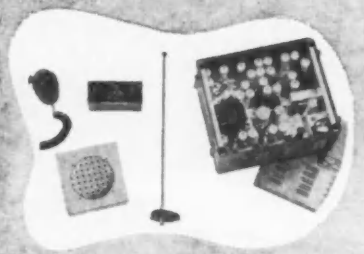
COMCO
"FLIGHTCOM"
TWO-WAY VHF
RADIO FOR AIRCRAFT
FREQUENCY MODULATED
25-50 MC — 152-174 MC.



Provides communication between ground FM communication systems and executive or utility aircraft

COMPACT—mounts in smallest planes
LIGHT—total weight only 23 lbs.
LOUD—full watt audio to speaker
POWERFUL—10 watts 30-50 mc. band
7½ watts 152-174 mc. band
LOW BATTERY DRAIN
PERFORMANCE—identical with ground station equipment.

For details contact your nearest COMCO dealer

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Manufacturers of Radio and Electronic Equipment
COMMUNICATIONS COMPANY, INC.
CORAL GABLES 34 FLORIDA

Opie Dimmick

R. E. Kirberger

Dimmick Named Chairman Of Nomads Board of Regents

Nomads National Board of Regents has named Opie Dimmick of Tulsa as the board's chairman and R. E. Kirberger as secretary-treasurer for 1953. Both men are national regents and are members of the Tulsa Chapter of Nomads.

Dimmick, immediate past president of the Tulsa Chapter, is president and chairman of the Board of Century Geophysical Corporation. Born in Shutestan, La., he attended school at Opelousas and was graduated from Louisiana State University. Dimmick is coordinator of the Tulsa Chapter's activities in the International Petroleum Exposition in May.

Kirberger is connected with Unit Rig & Manufacturing Company.

Byron Jackson Co. Elects Harcus to Board of Directors

Robert T. Harcus has been elected to the board of directors of Byron Jackson Company to fill the vacancy created by the resignation of C. S. Thomas, recently appointed undersecretary of the Navy.

Harcus was also appointed to the newly created office of executive vice president. Joining the company as export representative in 1945, Harcus became identified with the commercial development of the jet perforating process for oil wells and in 1949 was appointed executive vice president and general manager of International Cementers, Inc., which later became BJ Service, Inc. Harcus was named vice president of the parent company in 1951 and assistant to the president.

Fryback, Pyle and Klein Receive Honeywell Promotions

Devon W. Fryback has been named sales manager of the eastern region for Industrial Division of Minneapolis-Honeywell Regulator Company, Philadelphia. O. B. Pyle, Jr. has been appointed industrial manager of the Mid-Atlantic area and Edward J. Klein as industrial manager for the firm's Philadelphia branch office.

Fryback joined Honeywell in 1927 and worked in the company's Chicago, New York and Connecticut territories. He was industrial manager in Hartford and branch manager in Albany.

W. J. Alexander Is Associated With Pool Well Servicing

W. J. Alexander, formerly with the AAODC in Dallas, is now associated with Pool Well Servicing Company of San Angelo operating a new power casing tong in the Permian Basin area. Alexander worked on drilling rigs for several drilling contractors in West Texas and South Louisiana and for The Ohio Oil Company as field engineer at Iran, Texas. He is a graduate of Tarleton State College, Stephenville, Texas, and Texas A & M College.

Sales and Service Engineers Join T. D. Williamson, Inc.

T. D. Williamson, Inc. has announced the appointment of E. O. (Steve) Owens and Don L. Long as sales and service engineers.

Owens has been employed in corrosion engineering and cathodic protection capacities with the Bureau of Mines, Cities Service Gas Company, Huddleston Engineering and Brance-Krachy Company. In his new position Owens is assigned the states of Oklahoma, Arkansas, Missouri, Kansas and eastern Nebraska.

Long was employed by Mid-Continent Pipe Line Company and worked a year with Blaw-Knox as design engineer in Tulsa. Recently Long was employed by Williams Brothers Company as construction engineer.

Cleco Distributors Named

The Cleco Division of the Reed Roller Bit Company, Houston, has announced the appointment of General Equipment and Machine Company, South Bend, Ind.; A and I Supply Company, Charleston, W. Va.; Lyons Machinery Company, Little Rock, Ark.; and Equitable Equipment Company, Inc., New Orleans, La., as distributors for Cleco products in their areas.

Be sure the connections ARE LEAK PROOF!

In LP Gas Underground Storage Tubing Strings

Rectorseal has proved to be the only compound that assures leak-proof joints in LP Gas underground storage tubing strings. Rectorseal is your perfect sealant because it's sure, easy-to-use, economical.

It never hardens—never gets brittle. It's thin in the can but thickens in the joint to a plastic elasticity that assures a positive seal for the life of the connection. Make a test—try the best. There's no seal like Rectorseal. Ask for Rectorseal by name at your Supply Store. If they can't supply you, write

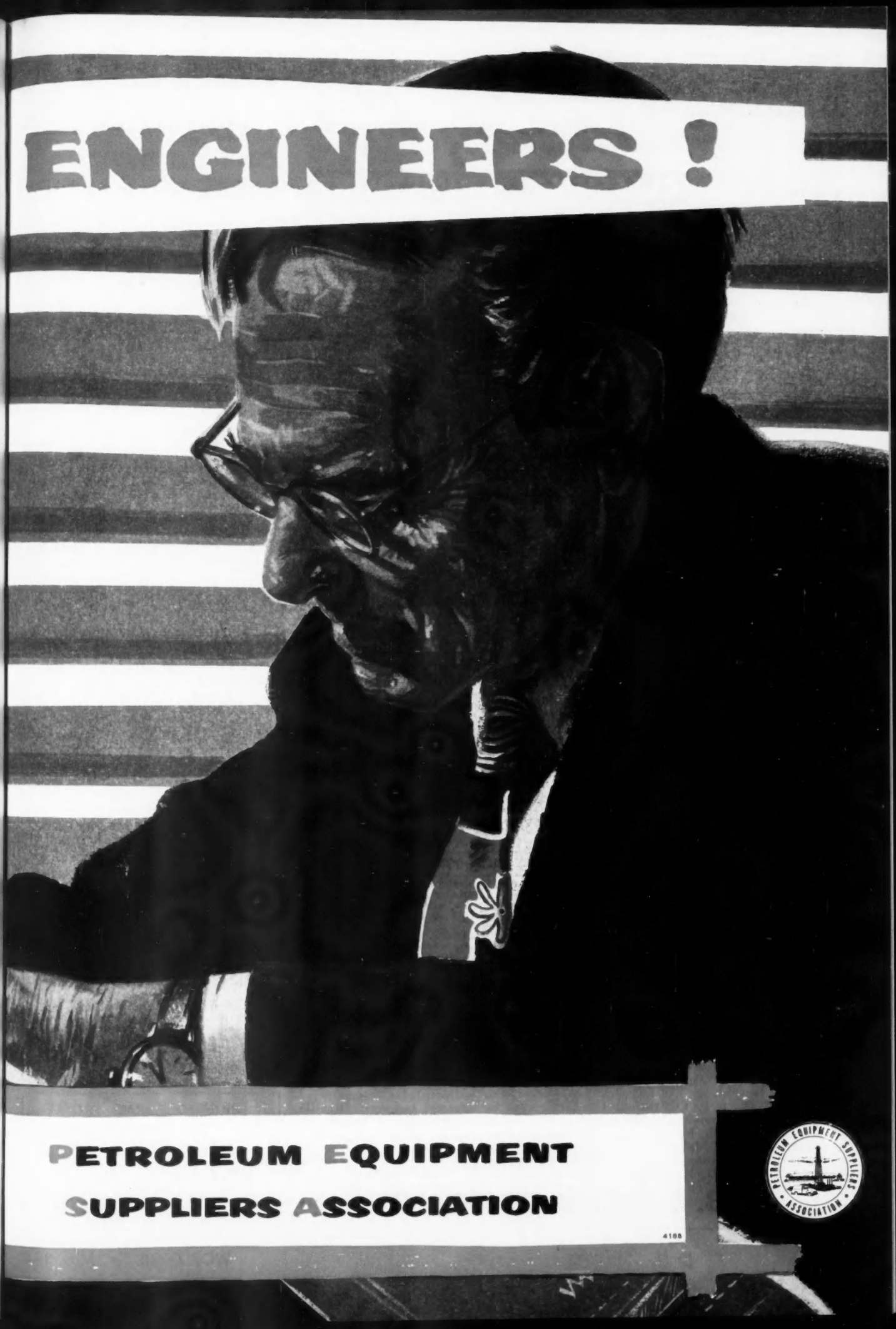
RECTORSEAL, Dept. "G"
2215 Commerce St., Houston 2, Texas

RECTORSEAL
Manufactured by
RECTOR WELL EQUIPMENT CO., INC.
Fort Worth, Texas
MAKING THE OIL INDUSTRY SAFER

HOUSTON LABORATORIES
Analytical and Consulting Chemists

Hydrocarbon Gas Analyses, Reservoir Equilibria Studies for Crude and Condensate Well, Waters, Brines, Corrosion and Industrial Analyses.

Phone CApitol 1319, Box 132, Houston, Texas


ENGINEERS !
PETROLEUM EQUIPMENT
SUPPLIERS ASSOCIATION
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PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION

WORLD OIL'S Trading Post

CLASSIFIED ADVERTISING

RATES: Regular Classified (undisplayed) set in this size type: 12 cents per word. Minimum charge, $3. Blind box address in our care counts six words. Replies forwarded without charge. **Situation wanted** ads, 6 cents per word. **Display ads**, set in suitably larger type with ruled border, $12 per column inch; situation wanted display ads, $6 per column inch. Ten percent discount for two or more insertions of same copy in consecutive issues. **All classified ads payable in advance. COPY DEADLINE:** 5th of month preceding date of issue. Send copy and checks to: **Trading Post Section, World Oil, P. O. Box 2608, Houston, Texas.**

FOR SALE

■ TWO 150 horsepower F and T boilers located at Eunice, New Mexico, Makin Drilling Co., Box 131, Hobbs, New Mexico.

■ CLOSING out an Estate, 1,000 barrel per day topping and asphalt plant. Crude oil and trained personnel available with plant. Located in an industrial Rocky Mountain community. Write Box 245, Shelby, Montana, for particulars.

SITUATIONS WANTED

ALEC CROWELL

an experienced oil man seeks a connection (job) due to fact that last three deep tests were failures and entire income and assets being liquidated to pay creditors and avoid bankruptcy. Twenty-eight years with Empire, Del Rey, Shamrock; Arkansas, Texas, Mississippi Commissions; war service Dept. Interior, FPC, REA, OPS; gas purchaser for Texas Eastern, Texas Illinois, owned interest 13 producers three states. Well educated, healthy, wide acquaintance, age forty-eight, please write liquidators for detail. DODD, HIRSCH & BARKER, Attorneys, Carondelet Bldg., Phone CAnal 7265, New Orleans, La.

Drilling contractor operating in West Texas and New Mexico desires to contact small or medium-sized independent oil company who needs an operating manager. Personal interview desired. Twenty years experience in all phases of the oil industry. Address replies to Box 94-W, WORLD OIL, Houston 1, Texas.

■ RADIO ENGINEER. Graduate with FCC operator's license and five years experience in V.H.F.—microwave communications field including site surveys, FCC licensing, system design and field installations, desires position with pipe line company having or contemplating a microwave system. Box 78-W, c/o World Oil, Houston, Texas.

DECALS

TRUCK LETTERING AND TRADEMARK decals made for your trucks. Easy to apply uniform, distinctive, economical for small or large needs. Write for Catalog. Mathews Company, 827 S. Harvey, Oak Park, Ill.

HELP WANTED

■ Division Geologist with Louisiana Gulf Coast region subsurface experience required by sound, substantial company in New Orleans. In reply, please state salary expected and give details of education and experience. Replies confidential. Box 75-W, c/o WORLD OIL, Houston, Texas.

■ SEISMIC Party Chief for work in United States with degree in Geophysics, Geology, or Engineering, age 26 to 35, capable of advancing in small progressive Contract Seismograph Company. Must be good interpreter. Salary commensurate with ability. Please include education and complete brief of experience in first reply. Replies confidential. Box 80-W, c/o World Oil, Houston, Texas.

BUSINESS OPPORTUNITIES

WILLISTON BASIN ROYALTIES

Dealers in Montana royalties since 1921, we now specialize in royalties under major company leases in the Montana portion of the Williston Basin. For information on our method of operation, write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

■ Hamilton & Hamilton, Inc. and Associated Companies, Northern Petroleum Company and Petroleum Acreage, Inc., have producing and semi-proven oil and gas leases in Montana, to sell or sub-lease to reliable parties on working agreement basis. Write for information: P. O. Box 1605, Room 535 Ford Bldg., Great Falls, Montana.

■ WILL TRADE wheat land located in Colorado for drilling equipment. Write, phone—875, or wire, Geo. L. Aycock, Jr., Guymon, Oklahoma.

EQUIPMENT WANTED

■ WANTED: One Thrible Jack-knife and substructure. No Junk Wanted! Makin Drilling Company, Phone 3-3141, Hobbs, New Mexico.

GEOPHYSICAL SERVICE

WHY DRILL DRY HOLES!
Amazing Results of Proven Geophysical Services Verified by Published Articles.
Have DEFINITELY located commercial wells even near dry holes. NO OTHER GEOPHYSICAL WORK NEEDED! Make EXACT drilling location. Determine approximate depth-thickness of oil zones. MOST SUCCESSFUL-EFFICIENT method we know. WORTH INVESTIGATING! **YOUNG AND CRITCHLOW,** 2031 N.W. Johnson, Portland, Oregon.

MISCELLANEOUS

WANTED—OLD COPIES OF THE COMPOSITE CATALOG

If you have any copies of the 1929, 1930, 1931 or 1932 editions of The Composite Catalog that you do not need we can put them to good usage. Please advise The Librarian, Gulf Publishing Company, P. O. Box 2608, Houston, Texas.

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Immediate delivery of producing and pipe line forms made from our complete line . . . Write for completely illustrated catalog.

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API Standard External Upset Tubing

WE OFFER FOR SALE a complete facility for finishing oil country drill pipe and tubing to API specifications. Present setup is for 2⅜" OD API standard external upset tubing. The range can be adjusted with additional dies to accommodate 1" OD to 5" OD tubing. This facility can be inspected in operation at our Versailles, Pennsylvania (Pittsburgh area) plant. Write or wire A. B. Murray Co., Inc., Elizabeth, New Jersey, for descriptive prospectus or discuss this with our chief engineer, Mr. S. B. Dunne, and/or P. S. Richards, who will be available during the International Petroleum Exposition and Congress May 14, 15, 16, 17, 18, 19, Room 1021, Hunt Bldg., Telephone Tulsa 2-8174, Tulsa, Oklahoma.

A. B. MURRAY COMPANY

Midwest Piping and Supply Announces Change of Firm Name

The name Midwest Piping and Supply Company, Inc., has been changed to Midwest Piping Company, Inc. by vote of the company's stockholders. No change has occurred in ownership, management, personnel or activities of the company. The officers explain that the change was made to give a more accurate description of the company's operations.

Walter H. McCann Receives National Supply Promotion

Walter H. McCann, chief tubular clerk for The National Supply Company, has been appointed supervisor of tubular sales for the company's Eastern Division. An employe of the company since 1936, McCann succeeds Walter Wirth, who retired recently.

McCann started at the Etna plant of the company's Spang-Chalfant Division and in 1939 was transferred to the Pittsburgh office.

J. D. Watson to Represent WECO In West Texas and New Mexico

J. D. Watson has been appointed sales representative for Well Equipment Mfg. Corp. in West Texas and New Mexico with headquarters in Hobbs, N. M.

A graduate of Texas Technological College, Lubbock, Texas, Watson engaged in oil field work in West Texas and later became associated with Bethlehem Supply Company, also in West Texas. He represented Reed Roller Bit Company in Hobbs before joining WECO.

Continental Supply Announces Field Personnel Changes

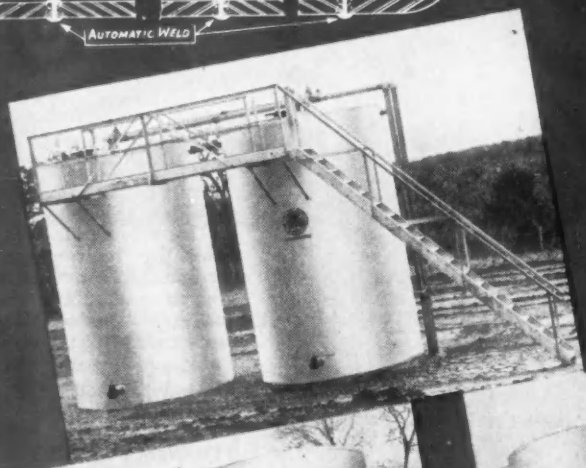
The Continental Supply Company has announced changes in field personnel. M. M. Marstrand, store manager at Lindsay, Okla., has taken over duties as manager at Duncan, Okla., and J. B. Crews, Jr., former field salesman at Duncan, has taken over the Lindsay store. Both stores are in the district headed by Van C. Moore of Ardmore, Okla.

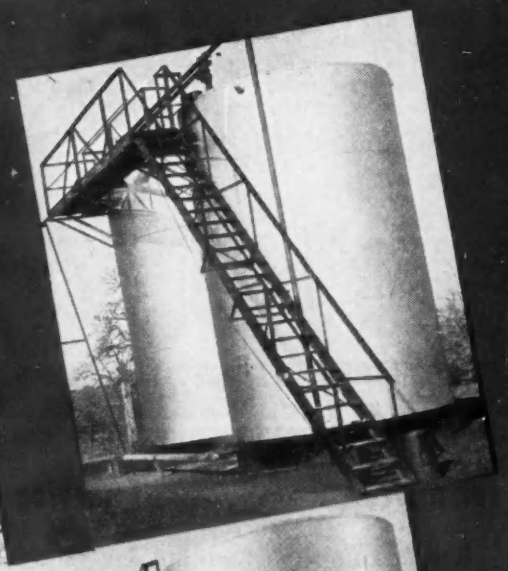
George R. Runnels, former field auditor at Houston, has become store manager at Corpus Christi, Texas.

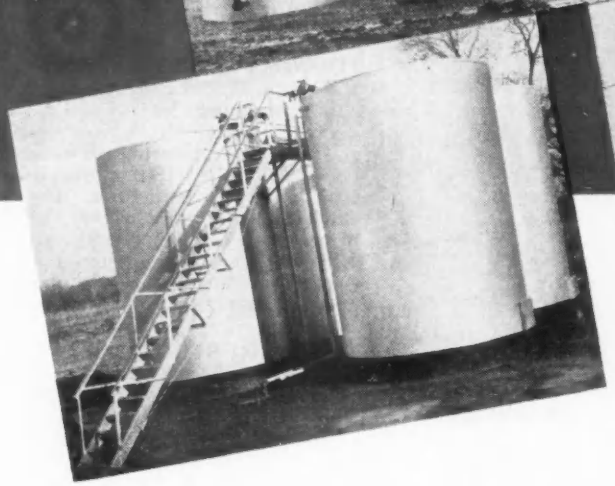
Dowell Announces Promotions

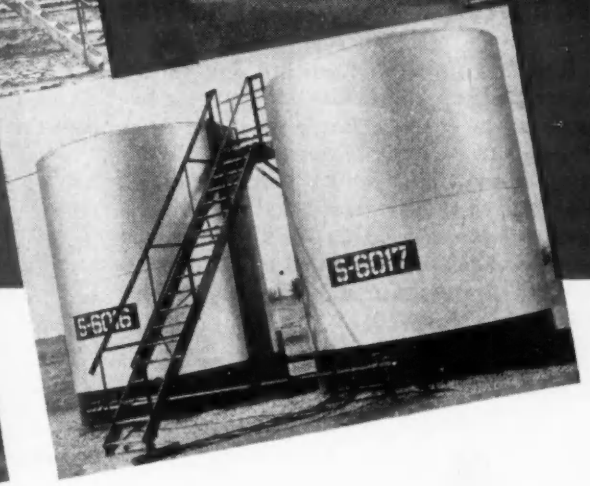
Dowell Incorporated has promoted Fred J. Green to area engineer with headquarters at Abilene, Texas; E. A. Ernst to station manager at Abilene; and John D. Halfhill to sales engineer, Abilene.

It's the WELD that makes M-C Welded Steel Tanks SUPERIOR









New steel *plus* welding by the shielded arc process (under rigid supervision), *plus* hydrostatic testing to insure each tank against leaks makes Maloney-Crawford BOLTED steel tanks SUPERIOR. Variety of sizes and capacities available with cone or flat bottoms or with aluminum decks.

- ★ **Full Automatic Welded**
- ★ **Flanged Decks and Bottoms**
- ★ **Hydrostatically Tested**
- ★ **P and M or Customer's Specifications**
- ★ **Trained crews available in Mid-Continent area to unload, upend, and align tanks and to erect walkways.**

MALONEY CRAWFORD

MALONEY-CRAWFORD TANK & MFG. CO.

See Us at INTERNATIONAL PETROLEUM EXPOSITION TULSA MAY 14-23

FACTORY AND GENERAL OFFICE: 38 North Peoria—Box 659—Tulsa, Oklahoma.
EXPORT REPRESENTATIVE: Baird Lines, 420 Lexington Avenue, New York, N. Y.
CANADIAN REPRESENTATIVE: Maloney-Crawford of Canada, Ltd., 810 Lancaster Bldg., Calgary.
TEXAS PANHANDLE REPRESENTATIVE: Atlas Tank Co., Pampa, Texas.

New Books, Maps and Movies

PB 111035, PULSED GEIGER TUBE OPERATIONS, Office of Technical Services, U. S. Department of Commerce, Washington 25. $.50.

Methods for producing better atomic radiation measuring devices are described in this official government bulletin. Use of rapidly recurring brief pulses of voltage has opened a field for better atomic radiation instruments.

SURVEY OF RESIDENTIAL GAS SERVICE BY COUNTY, Bureau of Statistics, American Gas Association, 420 Lexington Avenue, New York 17, $5.

A revised edition of this survey, the report includes data as of September 1, 1952 for each county in the United States including the name of the local utilities, type of gas being furnished, its heat content, and specific gravity and average pressure at consumer meters. Of special interest to persons interested in market research is the information on population, gas utility customers and available data concerning gas refrigerator and water heating saturations.

SAFETY SAVES, Clark Equipment Company, Industrial Truck Division, Battle Creek, Mich.

This 30 minute sound film on training and safety for industrial truck operations was filmed in factory and warehouse locations and illustrates the do's and don'ts of safe driving. The film is available on a loan basis by writing to the company.

FEDERAL POWER COMMISSION REPORTS, Volume 9, Publications Division, Federal Power Commission, Washington 25, W. C. $4.

This volume includes all formal opinions issued by the commission in 1950, intermediate decisions which have become final, and an appendix of selected orders in the nature of opinions. The publication contains index-digests of the opinions, decisions and orders, and its table include cases, statutes and rules of the commission cited.

FOUNDATION ENGINEERING, Ralph B. Peck, Walter E. Hanson, and Thomas H. Thornburn, John Wiley & Sons, 440 Fourth Avenue, New York 16. $6.75.

This volume presents basic information required for the selection, design and construction of substructures. The authors emphasize the types of foundations met in everyday practice, introducing the material with a survey of the properties of subsurface materials and the identification and properties of soils and rocks.

GEOLOGIC STRIP MAPS OF TEXAS HIGHWAYS, Highway Strip Map Committee of the Houston Geological Society, Box 331, Houston, Texas. $1.50.

The first in a series of maps, this initial map covers portions of highways 75 and 77 from Galveston through Houston, Conroe, Corsicana, Dallas, and Denton, Texas. to the Texas-Oklahoma state line. The map is designed to give the names of the geologic formations, oil fields and other information to the person traveling the territory. Other information such as climate, history, elevation, oil field locations and locations of motels, cafes and radio stations is shown. Copies can be obtained from the secretary of the society at the above address.

ADVANCES IN SYNTHETIC FUELS TECHNOLOGY, 1952. P. N. 34306, U. S. Department of the Interior, Washington, D. C. Free.

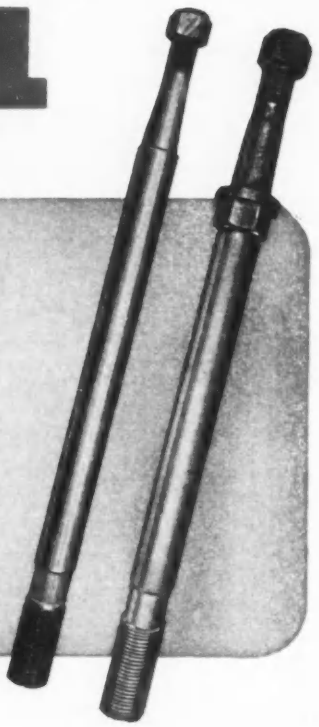
This is a report covering the calendar year 1952 prepared by Secretary of the Interior Oscar L. Chapman for submission to Congress. The report deals with important technical advances in producing synthetic liquid fuels from coal and oil shale, further recommendation that prototype commercial plants be started, and industry's rapidly growing interest in the program.

RED DEVIL

"DIA-HARD" PISTON RODS

For high pressure abrasive service

RED DEVIL Piston Rods are first choice where drilling conditions are severest because of the extreme hardness of the deep HIGH-CARBON wear resistant "DIA-HARD" case, coupled with tough core properties which give the highest tensile strength against breakage. All rods are hardness tested and precision gauged to maintain a world-wide reputation for quality. Write for Catalog No. P-101.



RED DEVIL **PISTON PULLER**

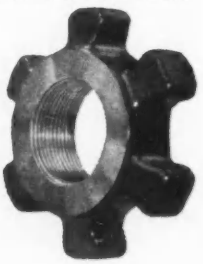
For tapered type rods

The usual practice of removing pistons from rods by blows of a sledge hammer often damages either pistons or rods. A Red Devil piston puller easily and quickly removes badly stuck pistons without injury to either part. All elements are made of finest quality alloy steel, heat-treated for strength and long life. Write for Catalog No. P-106.

RED DEVIL **PISTON ROD LOCK NUT**

These "Hammer Lug Type" nuts provide a fast and positive means for locking piston rod in crosshead. Made from alloy steel and heat treated, they will last indefinitely. Face of nut is precision machined for full seating surface at right angles to axis of threads to prevent fatigue stresses in rod. Write for Catalog P-102.

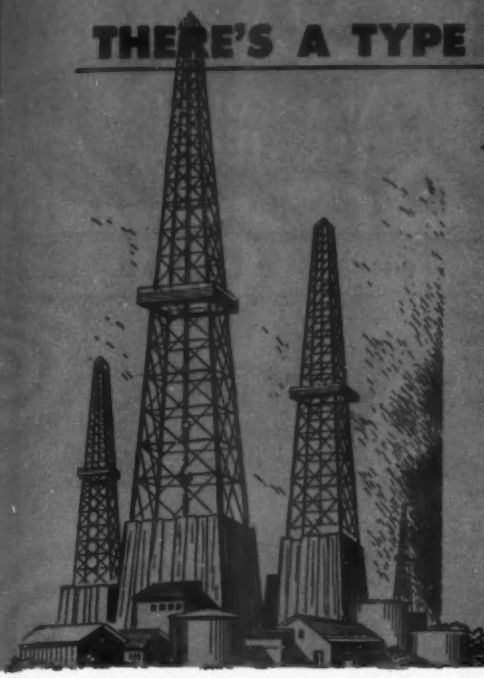
Complete information in Composite Catalog or write for price catalogs noted above. Red Devil products are available through your supply store.



OIL WELL MANUFACTURING CORP.

6008 S. Alameda Street, Los Angeles 1, California

THERE'S A TYPE OF AMERICAN FOR EVERY OIL FIELD NEED!



For more than 33 years *American* has *specialized* in the design and production of roller bearings engineered for the gruelling duties of the oil country.

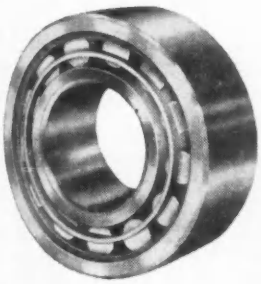
That's why probably more *Americans* go into the crown and traveling blocks, swivels, rotaries, slush pumps, draw works, transmission equipment, and compounding units of the industry than any others.

Engineers, who are as "at home" on a derrick floor as they are in their own office, design them. Craftsmen who understand the exacting standards of the oil industry produce them. Metals for them are selected with the knowledge that hundreds of thousands of dollars ride on their successful performance. In short *Americans* are made for *you!*

In addition to a wide range of the standard types and sizes shown below, American Roller Bearings are custom made to your specifications. Send us your blueprints for quotations and recommendations.

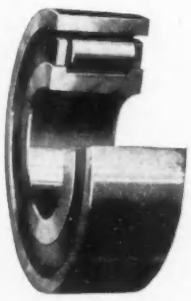
MEDIUM-HEAVY • HEAVY • SUPER-HEAVY DUTY

American conventional type roller bearings are characterized by simplicity of design, special high quality bearing steel and precision manufacturing. They are made in medium-heavy, heavy, and super-heavy duty types differing in cross section and weight to make each type exactly suitable for the loads and stresses imposed for every condition and application required. Available in steel or bronze end ring, as desired.



STAMPED CAGE

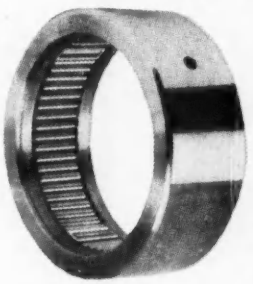
To meet the demands of many manufacturers for a precision bearing of moderate cost, American developed the stamped cage type. This is a straight inner race bearing with a stamped steel cage and snap rings retaining the roller assembly in relation to the outer race. Available in standard sizes or in special sizes to your order.



RADIAL

American Radial Roller Bearings are engineered to exacting standards that result in better performance and minimum maintenance. Made with bronze cages. Furnished in 5 styles, 6 S.A.E. series. Special designs also available.

NON-SKEW NEEDLE— SINGLE AND DOUBLE ROW



American Needle Bearings are manufactured in single row and double row styles to AFBMA standards. In addition, American Needle Bearings incorporate the patented Non-Skew feature consisting of 3 roller guide blocks spaced at 120° intervals to prevent roller twist or misalignment. Also furnished to special dimensions and with special clearances if required.

do you have our CATALOG?

If you specify, buy or influence the purchasing of roller bearings you should have an AMERICAN Catalog. Your request on company letterhead, please, for record purposes.

AMERICAN ROLLER BEARING CO.

416-420 MELWOOD AVENUE • PITTSBURGH 13, PA.

VISIT OUR BOOTH 20-21, SILVER LANE

INTERNATIONAL PETROLEUM EXPOSITION

DRILLING EQUIPMENT MFG. CO.
DEMCO
OKLAHOMA CITY, OKLA. U.S.A.

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in the California Bldg.
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845 S. E. 29th Street
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OKLAHOMA CITY, OKLA.

SQUEAKS from the BULLWHEEL

Not for Credit

A fraternity house had sent its curtains to be laundered. It was the second day that the house had stood unveiled and that morning the following note was received from the sorority house across the street:

"Dear Sirs: May we suggest that you procure curtains for your windows. We do not care for a course in anatomy."

The chap who left his shaving to read the note promptly answered: "Dear Girls: The course is optional."

•

The Artist

The artist kissed his model. "I bet you do that to all your models," she said.

"No," he replied. "You are the first."

"How many models have you had?"

"Four," he answered. "A rose, an onion, a banana and you."

•

Compulsory Protection

"Dad," asked the small boy, "Why is a man not allowed to have more than one wife?"

"My son," replied the father, "when you are older you will realize that the law protects those who are incapable of protecting themselves."

•

New Career

Forty years they had been hitched, and 40 years she had made the living; then he died. The thrifty widow instructed that his body be cremated and the ashes delivered to her. Carefully placing them in an hourglass she set it on the mantel, sat down to rock and said: "Now, you worthless bum, at last you're going to work."

"I told them not to use so much acid!"

Inconspicuous

Girl: "Doctor, I want you to vaccinate me where it won't show."

Doctor: "All right, stick out your tongue."

•

Off Limits

"Oh, here's the place mother told me to stay away from. I thought we'd never find it."

•

Good Advertising

"I hear you advertised for a wife. Any replies?"

"Hundreds!"

"What did they say?"

"Most of 'em said: 'You can have mine!' "

Gotkool
water cans
and coolers
GOTKOOL WATER CAN
Made in 1½, 2, 3, 5, 10, 15 and 20 gallon sizes. Push-Button Faucet at slight additional cost.
KEEP PURE DRINKING WATER ALWAYS HANDY
GOTKOOL WATER COOLER
Made in 2, 3, 5, 8, 10, 15 and 20 gallon sizes with Push-Button Faucet.
GOTT Water Coolers are the convenient way to keep drinking water handy to the worker, protect it from impurities. Their exclusive construction keeps water cool for long periods. Snug-fitting, large, removable top, handy non-leaking push-button faucet. GOTT Water Cans for handy field use. Your supply store has them, get one today!
STANDARD OF THE OIL FIELDS
Insist on the Genuine
Gott
WATER COOLER
PURE WATER
H. P. GOTT MFG. CO.
WINFIELD, KANSAS

What's NEW

In Perforating, Logging, and Fishing Tool Services

McCULLOUGH
NEW SERVICES • NEW TOOLS
NEW WAYS OF DOING THINGS

Latest News About New Tools, Techniques and Services

SEE THEM NOW at the Tulsa Oil Show!
New and Improved **McCULLOUGH TOOLS**
You've Heard So Much About

McCULLOUGH SCINTILLOMETER

The new McCullough Radiation Well Logger with the amazing Scintillometer (Gamma Ray and Neutron) will demonstrate its superior ability to clearly and accurately log beds of any thickness at any speed. You will be permitted to test the acute sensitivity of the new instrument with the feeble rays of your luminous dial watch. A completely equipped McCullough Radiation Well Logging Truck will be on display.

McCULLOUGH M-3 BURRLESS BULLET PERFORATOR

The improved McCullough M-3 Burrless Bullet Perforator, the hardest shooting gun perforator in the world, features an increase of 25% in penetration over former McCullough bullet type perforators. The M-3 will outshoot any comparable size bullet or jet gun through one string of casing into soft or medium hard formation. McCullough M-3 Perforators, Burrless Bullets and actual penetration samples will be on display.

McCULLOUGH GLASS JET PERFORATOR

McCullough Glass Jet Perforators feature many new improvements. New bayonet type, junk-free Steel Strip Carriers—one-third less explosives, yet two-thirds deeper penetration in solid steel targets—now available in three types; Standard Casing Glass Jet, Super Casing Glass Jet and Super Formation Glass Jet—exclusive slug-free, straight sided holes. Particularly applicable through multiple strings and in hard and extra hard formation.

McCULLOUGH TYPE "B" BRIDGE PLUG

The only one-piece, drillable, all metal, explosion-expansion bridge plug. Drills out easily—no moving nor hardened parts to impede drilling out. Resists corrosion and electrolysis. Saves rig time in running, locating and setting. Plugs in open hole in hard formations. Assures a positive seal under the heaviest loads. Special display will permit you to weigh yourself and pressure test plug at the same time.

McCULLOUGH MAGNA-TECTOR AND BACK-OFF SERVICE

Be sure to see these remarkable tools. The Magna-Tector measures both stretch and torque in stuck pipe, locates lowest free point. The McCullough String Shot loosens first joint above the free point. Combines all the advantages of both the Magna-Tector and String Shot into a single service with one set-up. Many remarkable jobs have been accomplished at great savings to the operator.

McCULLOUGH OTHER NEW AND IMPROVED TOOLS

The complete line of all other McCullough Electric Wire Line and certain Fishing Tools will also be on display, including the McCullough Bottom Hole Jet Cutter, Jet Casing Cutter and Double Acting Rotary Jars—tools that have been used with outstanding success in every active oil field in the world. Qualified McCullough representatives will demonstrate the amazing abilities of all McCullough Tools.

LOCATION—BOOTHS 22-23-24. Use Entrance No. 2 from Twenty-First Street (the main street to the show from Tulsa) at the southeast end of the show grounds. McCullough booths are to the right of the entrance, opposite Old Timers Headquarers.

PERFORATING, RADIATION LOGGING, AND FISHING TOOL SERVICE—ANYWHERE—ANYTIME.

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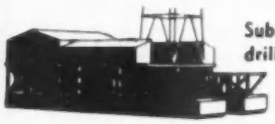
SERVICE LOCATIONS: TEXAS: Houston, Snyder, Alice, Cisco, Corpus Christi, McAllen, Odessa, Tyler, San Angelo, Victoria, Wichita Falls, Luling, Beaumont, Sherman, Midkiff, El Campo. **OKLAHOMA:** Oklahoma City, Guymon, Healdton, Hominy. **ARKANSAS:** Magnolia. **MISSISSIPPI:** Laurel. **NEW MEXICO:** Hobbs. **KANSAS:** Great Bend. **WYOMING:** Casper. **CALIFORNIA:** Los Angeles, Avenal, Bakersfield, Ventura. **LOUISIANA:** Houma, Lake Charles, New Iberia, Shreveport. **COLORADO:** Sterling. **NORTH DAKOTA:** Williston. **UTAH:** Vernal.

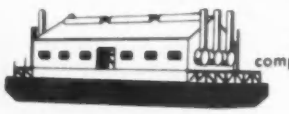
Levingston

BUILDS FINE SPECIALIZED MARINE EQUIPMENT FOR THE PETROLEUM INDUSTRY



Submersible drilling barges

Tugs

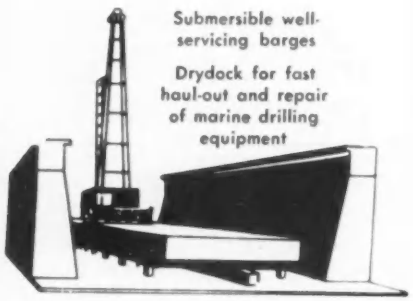


Boiler and compressor barges

Water, oil, and supply barges

Submersible well-servicing barges

Drydock for fast haul-out and repair of marine drilling equipment



Levingston is not only located conveniently with respect to marine drilling operations on the Gulf Coast, but here you will find marine engineers and constructors who understand the language of oil operators. Bring your marine petroleum equipment problems to Levingston *first* for a quick economical solution.

Levingston

SHIPBUILDING CO.

Orange, Texas

Short Form

According to unofficial sources, a new simplified income tax form contains only four lines:

1. What was your income for 1953?
2. What were your expenses?
3. Subtract 2 from 1.
4. Send it in.

•

Different Labels

The rich are alcoholics; the poor are drunks.

•

Ain't Dead Yet

Nurse: "Doctor, every time I lean over this patient to listen to his heart, his heart beats increase. Just what shall I do?"

Doctor: "Button your collar."

•

One Never Knows

Pat was thought to be dying. A friend at the bedside asked: "Have you made peace with God and denounced the devil?"

"I've made peace with God," Pat answered, "but I'm in no position to antagonize anybody!"

•

Wrong Course

Because of a dense fog, a Mississippi river steamboat was forced to stop in the mouth of a tributary stream. A passenger asked the captain, "Why the delay?"

"Can't see up the river," the captain said.

"But I can see the stars overhead," the passenger replied sharply.

"Sure you can," replied the captain. "But unless the boilers bust, we aren't going that way."

•

Opportunist

The barmaid was a flirt and when the lieutenant went out to buy a paper she pursed her lips invitingly and leaned over the bar toward the shy young sailor. Putting her face against his, she whispered, "Now's your chance, darling." The sailor looked around the empty room. "So it is," he remarked and promptly drank the lieutenant's beer.

"What could I know about a long division test? If she'd ask me how to add a suction boom to a skid-mounted pump, I could tell her."

Lucky One

Three old maids went for a walk just before retiring one evening. Returning home, one stepped into her bedroom and exclaimed, "Oh, girls, someone's been trying my bed."

The second O. M. glanced into her room and exclaimed, "Girls, someone's also tried my bed."

The third O. M. looked into her room, then stood in the doorway and whispered, "Good night, girls."

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Lights Out

Greta—"Tom and I drove past your house last night about midnight, but I guess you were not at home, the house was dark."

Grace—"Just because the lights in the house were out, doesn't mean the current was turned off."

"It's oil, sir--LANE-WELLS on the job"